Sectoral Economics Program
Thailand Development Research Institute

The Economic Impact of the Liberalization of Oil Market

With Contribution from

The Petroleum Institute of Thailand

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Research Team Members

Dr. Nipon Poapongsakorn	Project Leader
Dr. Tienchai Chongpeerapien	Researcher
Dr. Somkiat Tangkitvanich	Researcher
Ms. Karuna Wiwattanakantang	Research Assistant
Mr. Narong Chuanchai	Research Assistant

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บทคัดย่อสำหรับผู้บริหาร
ผลกระทบของการเปิดเสรีตลาดน้ำมันในประเทศไทย

การเกิดขึ้นของวิกฤติการณ์น้ำมันทั้งสองครั้งได้ทำให้เสถียรภาพของราคาน้ำมันกลายเป็นประเด็นทางการเมืองที่มีความอ่อนไหวเป็นอย่างยิ่ง ในอดีตรัฐบาลไทยได้ดำเนินโยบายหลายประการเพื่อรักษาเสถียรภาพของราคาน้ำมัน โดยมีมาตรการหลักของนโยบายคือ การควบคุมราคาผ่าน "กองทุนรักษาเสถียรภาพของราคาน้ำมัน" หรือ "กองทุนน้ำมัน" ซึ่งเป็นกลไกในการดำเนินนโยบายสองประการคือ หนึ่ง การเก็บเงินจากผู้ค้าน้ำมันในช่วงที่ราคาในตลาดโลกอยู่ในระดับต่ำ เพื่ออุดหนุนไม่ให้ผู้ค้าเหล่านั้นขึ้นราคาน้ำมันในประเทศในช่วงที่ราคาในตลาดโลกปรับตัวสูงขึ้น สอง การเก็บเงินจากผลิตภัณฑ์น้ำมันบางชนิด เช่น น้ำมันเบนซิน ซึ่งถือว่าเป็นสินค้าสำหรับผู้บริโภคที่มีรายได้สูง เพื่ออุดหนุนผลิตภัณฑ์อื่น เช่น น้ำมันดีเซลและแอลพีจี ซึ่งถือว่าเป็นสินค้าสำหรับผู้บริโภคที่มีรายได้ต่ำให้มีราคาถูกลง อันเป็นการ "บิดเบือนทางราคา" (price distortion)

แม้ว่าในบางช่วง กองทุนน้ำมันได้ช่วยลดผลกระทบอันเกิดจากการเปลี่ยนแปลงของราคาน้ำมันในตลาดโลกในระยะสั้นก็ตาม ผลกระทบในด้านลบของมันต่อโครงสร้างตลาดน้ำมันและระบบเศรษฐกิจโดยรวมในระยะยาวก็มีไม่น้อย รัฐบาลในช่วงต่อมาซึ่งตระหนักถึงผลเสียดังกล่าว จึงได้ตัดสินใจเปิดเสรีตลาดน้ำมันของไทยครั้งใหญ่เมื่อปี 2534 โดยนำเอาระบบราคา "ลอยตัว" มาใช้สำหรับน้ำมันเบนซิน ดีเซล ก๊าด และ เตา พร้อมกับลดบทบาทของกองทุนน้ำมัน ระบบใหม่นี้ทำให้ราคาน้ำมันในประเทศเปลี่ยนแปลงตามราคาน้ำมันในตลาดโลก และ มีการอุดหนุนระหว่างผลิตภัณฑ์น้อยลง

แม้ว่าในปัจจุบัน จะเป็นที่ตระหนักกันโดยทั่วไปในหมู่นักวิชาการ นักวางแผนและนักธุรกิจแล้วว่า การเปิดเสรีตลาดน้ำมันก่อให้เกิดผลดีต่อสังคมและสร้างประโยชน์ต่อผู้บริโภคก็ตาม ประชาชนและนักการเมืองส่วนหนึ่งยังคงไม่เข้าใจถึงผลกระทบจากการเปิดเสรีดังกล่าวอย่างถูกต้อง เช่น มีประชาชนไม่น้อยเชื่อว่า บริษัทน้ำมันมักฉวยโอกาสปรับราคาน้ำมันในขาขึ้นเร็วกว่าขาลง หรือเชื่อว่าการเปิดเสรีทำให้บริษัทน้ำมันสามารถรวมหัวกันกำหนดราคาจำหน่าย เป็นต้น นอกจากนี้ในช่วงที่น้ำมันในตลาดโลกมีราคาสูงขึ้น มักมีเสียงเรียกร้องให้รัฐบาลหันกลับมาควบคุมราคาน้ำมันอีกครั้ง นักการเมืองในบางยุคยังเสนอให้นำระบบน้ำมันราคาเดียวทั่วประเทศมาใช้อีกด้วย แม้ว่า แนวคิดดังกล่าวจะเป็นการสวนทางกับการเปิดเสรีก็ตาม ความไม่เข้าใจเหล่านี้อาจสร้างความสับสน และอาจส่งผลให้ผู้กำหนดนโยบายตัดสินใจกลับไปใช้นโยบายการควบคุมราคาน้ำมัน หรือ เพิ่มการกำกับ

ดูแลในช่วงที่เกิดวิกฤติการณ์ทางเศรษฐกิจ เช่นในปัจจุบัน ซึ่งจะทำให้เกิดความเสียหายขึ้นต่อระบบเศรษฐกิจโดยรวม

การวิจัยเรื่อง "ผลกระทบของการเปิดเสรีตลาดน้ำมันในประเทศไทย" นี้ มีจุดมุ่งหมายที่จะศึกษาผลกระทบของการเปิดเสรีตลาดน้ำมันของไทย เมื่อปี 2534 อย่างเป็นระบบ โดยยึดจุดยืนบนผลประโยชน์ของประชาชนและสังคมเป็นสำคัญ ในการวิจัยนี้ คณะผู้วิจัยได้ศึกษาผลกระทบของการเปิดเสรีตลาดน้ำมันในประเทศไทยใน 3 ประเด็นหลักดังต่อไปนี้ คือ

1. ผลกระทบของการเปิดเสรีต่อเสถียรภาพของราคาน้ำมัน และ ความเร็วในการปรับราคาน้ำมันของผู้ประกอบการ
2. ผลกระทบของการเปิดเสรีต่อประสิทธิภาพในการจัดสรรทรัพยากร โดยประเมินถึงผลกระทบต่ออุตสาหกรรมสาขาที่บริโภคน้ำมันมากและแบบแผนการบริโภคน้ำมันโดยรวมของประเทศ นอกจากนี้ คณะผู้วิจัยยังศึกษาว่าการนำเอาระบบน้ำมันราคาเดียวทั่วประเทศ (single oil price system) มาใช้มีความเหมาะสมหรือไม่
3. ผลกระทบของการเปิดเสรีต่อโครงสร้าง พฤติกรรมและผลประกอบการของอุตสาหกรรมค้าปลีกน้ำมัน การเปลี่ยนแปลงที่เกิดขึ้นกับผู้บริโภคทั้งด้านราคา ความสะดวกสบายและคุณภาพในการบริการ ตลอดจน ความคิดเห็นของผู้บริโภคต่อการเปลี่ยนแปลงดังกล่าว

ผลกระทบต่อเสถียรภาพราคาน้ำมัน

ในประเด็นผลกระทบของการเปิดเสรีต่อเสถียรภาพของราคา คณะผู้วิจัยพบว่า *การควบคุมราคาน้ำมันผ่านกลไกของกองทุนน้ำมันนั้นเป็นสิ่งที่ไม่มีประสิทธิผลในระยะยาว* กล่าวคือ การควบคุมราคาดังกล่าว จะมีประสิทธิผลเฉพาะในสถานการณ์ที่ราคาน้ำมันในตลาดโลกมีการเปลี่ยนแปลงเพียงเล็กน้อยเท่านั้น เมื่อราคาดังกล่าวมีการเปลี่ยนแปลงมาก เช่นในช่วงก่อนการเปิดเสรีตลาดน้ำมันในปี 2534 การควบคุมราคาก็กลายเป็นสิ่งที่ไม่มีประสิทธิผลอีกต่อไป เนื่องจากเงินทุนสำรองในกองทุนน้ำมันมีปริมาณลดลง ทำให้มีความจำเป็นที่จะต้องมีการขึ้นราคาน้ำมันครั้งใหญ่ ซึ่งทำให้เกิดการตื่นตระหนกในหมู่ประชาชน *ในทางตรงกันข้าม นโยบายราคาน้ำมันลอยตัว ซึ่งเป็นผลจากการเปิดเสรี นอกจากช่วยให้ราคาน้ำมันมีเสถียรภาพมากขึ้นในระยะยาว ซึ่งเห็นได้จากการไม่มีการเปลี่ยนแปลงราคาขนานใหญ่แล้ว ยังช่วยให้ผู้บริโภคเคยชินกับการปรับราคาน้ำมันโดยไม่ตื่นตระหนก ผลกระทบที่สำคัญประการหนึ่งของการเปิดเสรีจึงได้แก่ การทำให้น้ำมันมีความเป็น "สินค้าทางการเมือง" น้อยลง*

ผลกระทบต่อความเร็วในการปรับราคาน้ำมัน

ต่อประเด็นความเร็วในการปรับราคาน้ำมันในประเทศตามการเปลี่ยนแปลงราคาในตลาดโลกนั้น คณะผู้วิจัยได้สร้างแบบจำลองความสัมพันธ์ระหว่างราคาค้าปลีกน้ำมันที่กรุงเทพมหานคร กับราคาของตลาดจรที่สิงคโปร์ ซึ่งถือเป็นราคาตลาดโลกของไทย แบบจำลองดังกล่าวชี้ว่า ในช่วงก่อนการเปิดเสรี ราคาน้ำมันของไทยไม่ได้สะท้อนราคาของสิงคโปร์ในวันเดียวกัน เนื่องจากมีการควบคุมราคา อย่างไรก็ตาม *หลังการเปิดเสรี ทั้งในช่วงก่อนและหลังที่ประเทศไทยประสบวิกฤติการณ์ทางเศรษฐกิจในปี 2540 ราคาน้ำมันของไทยปรับตัวตามราคาน้ำมันที่สิงคโปร์ โดยการปรับราคาในช่วงขาขึ้นและขาลงไม่ได้มีความแตกต่างกันอย่างมีนัยสำคัญ ดังที่มีผู้ตั้งข้อสงสัยแต่อย่างใด* หลักฐานดังกล่าวเป็นเครื่องที่พิสูจน์ว่า แม้บริษัทน้ำมันอาจต้องการฉวยโอกาสหากำไรส่วนเกินในช่วงที่มีการเปลี่ยนแปลงราคา การฉวยโอกาสดังกล่าวก็เป็นสิ่งที่ไม่สามารถทำได้ในตลาดที่มีการแข่งขันอย่างสูงซึ่งเป็นผลจากการเปิดเสรี นอกจากนี้ อัตราการปรับราคาซึ่งเร็วขึ้นในปีหลังๆ ยังแสดงถึงการแข่งขันที่ทวีความเข้มข้นมากขึ้นในตลาดน้ำมันอีกด้วย

ผลกระทบต่อเศรษฐกิจสาขาต่างๆ

ในด้านผลกระทบของการเปิดเสรีต่อระบบเศรษฐกิจนั้น ผลการวิจัยชี้ว่า เศรษฐกิจสาขาที่ได้รับผลกระทบน้อยที่สุดคือ สาขาบริการ เนื่องจากเป็นสาขาที่บริโภคน้ำมันในสัดส่วนที่ต่ำ ในขณะที่สาขาที่ได้รับผลกระทบจากการเปิดเสรีมากที่สุดคือ สาขาขนส่งทั้งการขนส่งทางบก ทางน้ำและทางอากาศ สาขาประมง สาขาไฟฟ้า และ เหมืองแร่ เป็นต้น โดยสาขาเหล่านี้จะมีต้นทุนเพิ่มขึ้นระหว่างร้อยละ 0.14 ถึงร้อยละ 0.31 เมื่อราคาของผลิตภัณฑ์น้ำมันทุกประเภทเพิ่มขึ้นโดยเฉลี่ยร้อยละ 1 อย่างไรก็ตาม การเปิดเสรีเมื่อปี 2534 ได้ส่งผลกระทบต่อต้นทุนของสาขาต่างๆ ในสัดส่วนที่น้อยกว่าอัตราดังกล่าว เนื่องจากระบบราคาลอยตัวทำให้ผลิตภัณฑ์บางชนิด เช่น น้ำมันดีเซลและน้ำมันเตามีราคาสูงขึ้นโดยเปรียบเทียบ ในขณะที่ผลิตภัณฑ์บางชนิดเช่น น้ำมันเบนซินมีราคาถูกลงโดยเปรียบเทียบ ในขณะเดียวกัน ระบบราคาลอยตัวยังเป็นประโยชน์โดยตรงต่อผู้บริโภคบางกลุ่ม เช่น ผู้ใช้รถยนต์ส่วนตัว ซึ่งส่วนใหญ่ใช้น้ำมันเบนซินอีกด้วย

ผลกระทบต่อการลดการบิดเบือนทางราคา

ผลกระทบของการเปิดเสรีที่สำคัญอีกประการหนึ่ง คือ *การลดความสูญเสียของสังคมจากการบิดเบือนทางราคาที่เกิดจากกองทุนน้ำมัน* ความสูญเสียจากการบิดเบือนราคาดังกล่าวเกิดขึ้นทั้งในด้านการบริโภคและการผลิต ในด้านการบริโภค การบิดเบือนราคาทำให้ผู้บริโภคลดการบริโภคน้ำมันที่ถูกเก็บเงินอุดหนุนเข้ากองทุนน้ำมัน เช่น เบนซิน และ เพิ่มการบริโภคน้ำมันที่ได้รับการอุดหนุนจากกองทุนน้ำมัน เช่น ดีเซล และ แอลพีจี *จากการประมาณการโดยคณะผู้วิจัย การบิดเบือนราคา*

ดังกล่าว ทำให้เกิดความสูญเสียในการบริโภคถึงประมาณปีละ 640-1,300 ล้านบาทเมื่อคิดตามปริมาณน้ำมันที่บริโภคในปี 2533 การเปิดเสรียังช่วยลดความสูญเสียที่เกิดจากการสูญเสียเงินตราต่างประเทศ จากการที่ต้องนำเข้าน้ำมันดีเซลเพิ่มเติม เนื่องจากโครงสร้างราคาซึ่งบิดเบือนทำให้เกิดการบริโภคผลิตภัณฑ์ดังกล่าวมากเกินไป ระบบราคาลอยตัวยังช่วยลดความสูญเสียที่เกิดจากการปลอมปนน้ำมัน ซึ่งทำให้เกิดการหลบเลี่ยงภาษี และ ก่ออันตรายต่อชีวิตและทรัพย์สิน นอกจากนี้ การเปิดเสรียังช่วยลดความสูญเสียของเจ้าของรถยนต์ที่เกิดจากการดัดแปลงเครื่องยนต์เบนซินให้ใช้กับน้ำมันดีเซลหรือแอลพีจีอีกด้วย ในขณะเดียวกัน การเปิดเสรียังช่วยลดความสูญเสียในด้านการผลิตที่เกิดจากการบิดเบือนทางราคาที่ทำให้ผู้ผลิตต้องดัดแปลงโรงกลั่นน้ำมันของตน เพื่อให้สามารถกลั่นน้ำมันตามโครงสร้างการบริโภคที่ถูกบิดเบือนไป หรือ ต้องนำเข้าผลิตภัณฑ์น้ำมันบางอย่างเพิ่มเติม

ความเหมาะสมของนโยบายน้ำมันราคาเดียวทั่วประเทศ

ในประเด็นการนำนโยบายน้ำมันราคาเดียวทั่วประเทศมาใช้ตามที่เคยมีการเสนอขึ้นนั้น ผลการวิจัยชี้ว่า นโยบายดังกล่าวจะทำให้ราคาน้ำมันในเขตกรุงเทพมหานคร และ ภาคกลางส่วนหนึ่งสูงขึ้น ในขณะที่ราคาในส่วนที่เหลือของประเทศถูกลงตามระยะทางระหว่างจังหวัดนั้นกับกรุงเทพฯ ซึ่งถือว่าเป็นการกระจายรายได้ในรูปแบบหนึ่ง อย่างไรก็ตาม นโยบายดังกล่าวจะก่อให้เกิดต้นทุนต่อระบบเศรษฐกิจโดยรวม จากการบิดเบือนราคา ซึ่งทำให้แบบแผนการบริโภคเปลี่ยนแปลงไปจากที่เหมาะสม ทำให้เกิดความสูญเสียจากการบิดเบือนในการบริโภคประมาณ 6.5 ล้านบาทต่อปี นอกจากนี้ นโยบายดังกล่าวยังมีต้นทุนในการบริหารซึ่งอาจสูงถึง 45 ล้านบาทต่อปีอีกด้วย เนื่องจากรัฐอาจต้องเข้าแทรกแซงตลาดน้ำมันด้วยการเป็นผู้จำหน่ายเองในพื้นที่ห่างไกล ประเด็นที่สำคัญที่สุดก็คือ *นโยบายน้ำมันราคาเดียวมีประสิทธิภาพต่ำมากในการกระจายรายได้* เนื่องจาก ไม่สามารถอุดหนุนประชาชนที่มีรายได้ต่ำได้จริง ทั้งนี้เนื่องจาก รายได้เฉลี่ยของจังหวัดหนึ่งๆ ไม่ได้สัมพันธ์ในเชิงผกผันกับระยะทางระหว่างจังหวัดนั้นถึงกรุงเทพฯ เสมอไป เช่น เชียงใหม่อยู่ห่างไกลจากกรุงเทพฯ มากกว่านครสวรรค์ แต่กลับมีรายได้เฉลี่ยสูงกว่า เป็นต้น นอกจากนี้ ประชาชนในจังหวัดเดียวกันยังมีรายได้แตกต่างกันอีกด้วย การอุดหนุนประชาชนในจังหวัดหนึ่ง จึงเป็นการอุดหนุนทั้งผู้ที่มีรายได้ต่ำและผู้ที่มีรายได้สูงในจังหวัดนั้น ทางเลือกที่รัฐบาลควรดำเนินการในการกระจายรายได้ คือ การให้การอุดหนุนทางการเงิน (subsidy) โดยตรงแก่คนกลุ่มที่มีรายได้น้อยมากกว่าการอุดหนุนผ่านการกำหนดราคาน้ำมันดังกล่าว

ผลกระทบต่อตลาดค้าปลีกน้ำมัน

ในประเด็นผลกระทบต่อโครงสร้างและพฤติกรรมของตลาดน้ำมันและผู้ประกอบการ คณะผู้วิจัยได้เก็บข้อมูลทางสถิติต่างๆ ตลอดจนสำรวจสถานีบริการน้ำมันและสัมภาษณ์ผู้บริโภคในสี่ภาคทั่วประเทศ เพื่อหาข้อสรุปถึงผลกระทบจากการเปิดเสรีตลาดน้ำมันต่อโครงสร้าง (structure) แนวทางการดำเนินธุรกิจ (conduct) และ ผลประกอบการ (performance) ของอุตสาหกรรมค้าปลีกน้ำมันในประเทศไทย

ผลกระทบต่อโครงสร้างอุตสาหกรรมการค้าปลีก

ในด้านโครงสร้างอุตสาหกรรมค้าปลีกนั้น คณะผู้วิจัยพบว่า การเปิดเสรีส่งผลให้เกิดการขยายตัวของสถานีบริการน้ำมันเป็นอย่างมาก กล่าวคือ ในปี 2534 ที่เป็นปีที่มีการเปิดเสรี มีสถานีบริการทั่วประเทศเพียง 3,473 แห่ง โดยในจำนวนนี้ประมาณร้อยละ 89 เป็นสถานีของบริษัทน้ำมันรายใหญ่ (major oil company) สี่ราย คือ ปตท. เชลล์ เอสโซ และ คาลเท็กซ์ ซึ่งแสดงถึงการกระจุกตัว (concentration) หรือ การผูกขาดในตลาดค้าปลีกน้ำมันของไทย อย่างไรก็ตาม ภายหลังจากการเปิดเสรี บริษัทน้ำมันดังกล่าวและผู้ประกอบการรายใหม่ได้ขยายการลงทุนในประเทศอย่างรวดเร็ว โดยมีอัตราเฉลี่ยของการขยายตัวของสถานีบริการน้ำมันระหว่างปี 2535-2539 สูงถึงร้อยละ 25.5 ต่อปี ส่งผลให้จำนวนของสถานีบริการน้ำมันเพิ่มขึ้นเป็น 10,874 สถานีในปี 2540 โดยในจำนวนนี้มีสถานีบริการเพียงร้อยละ 36.7 เท่านั้น ที่เป็นของบริษัทน้ำมันสี่รายใหญ่ ซึ่งแสดงให้เห็นว่า *การเปิดเสรีทำให้ตลาดน้ำมันขยายตัว พร้อมกับลดการกระจุกตัวให้น้อยลง ซึ่งหมายความว่า มีการแข่งขันมากขึ้น*

ผลกระทบต่อการแข่งขันในด้านราคา

ผลกระทบของการลดการผูกขาดในตลาดน้ำมันดังกล่าว ทำให้เกิดการแข่งขันของบริษัทน้ำมันอย่างกว้างขวาง ทั้งการแข่งขันในด้านราคา (price competition) และ การแข่งขันในด้านอื่นๆ (non-price competition) ในด้านของการแข่งขันด้านราคา การเปิดเสรีทำให้สถานีบริการน้ำมันแต่ละแห่งสามารถจำหน่ายน้ำมันในราคาที่แตกต่างกัน ทำให้ผู้บริโภคสามารถเลือกรับบริการจากสถานีที่มีราคาถูกได้ จากการสำรวจพบว่า ความแตกต่างทางราคาของสถานีบริการน้ำมันในพื้นที่ใกล้เคียงกันอยู่ในระดับประมาณ 3-4 สตางค์ต่อลิตร นอกจากนี้ คณะผู้วิจัยยังพบด้วยว่า ในพื้นที่ที่มีการแข่งขันกันสูง สถานีบริการของบริษัทขนาดเล็กบางแห่งได้ใช้กลยุทธ์ตัดราคา เพื่อประชาสัมพันธ์และดึงดูดผู้บริโภค

ผลกระทบต่อการแข่งขันในด้านอื่นๆ

ในด้านการแข่งขันอื่นๆ การสำรวจชี้ว่า สถานีบริการน้ำมันหลายแห่งได้แข่งขันกันในการให้บริการที่ดีขึ้น ทั้งการให้บริการห้องน้ำสะอาด การให้สินเชื่อแก่ลูกค้า การให้ของแจกของแถม การให้บริการเช็ดรถ เติมน้ำ และ เติมลม ตลอดจน การให้บริการร้านค้าเพื่ออำนวยความสะดวก เป็นต้น ที่น่าสังเกตก็คือ การให้ของแจกของแถมได้กลายเป็นธรรมเนียมปฏิบัติของสถานีบริการส่วนใหญ่ไปแล้ว ในอนาคต คาดว่า การมีร้านค้าในสถานีจะเป็นสิ่งที่มีความสำคัญมากขึ้น เช่นเดียวกับการรักษาความสะอาดของสถานีบริการน้ำมัน เนื่องจากการแข่งขันกันในด้านอื่นจะมีข้อจำกัดมากขึ้นเช่น การขาดแคลนแรงงานจะทำให้ไม่สามารถปรับปรุงบริการ ณ จุดหัวจ่ายได้โดยง่าย ในขณะที่ การให้สินเชื่อจะมีปัญหาของการเพิ่มความเสี่ยง เป็นต้น กล่าวโดยสรุป *การแข่งขันทั้งในด้านราคาและในด้านอื่นๆ ดังที่กล่าวมานี้ได้เพิ่มทางเลือกของผู้บริโภคในการรับบริการ ปรากฏการณ์เหล่านี้ล้วนเป็นสิ่งที่ไม่พบในช่วงก่อนการเปิดเสรี*

ผลกระทบต่อยอดขายและกำไร

ผลของการแข่งขันที่เข้มข้นขึ้นนี้ทำให้ผลการประกอบการของสถานีบริการน้ำมันหลายแห่งตกต่ำลงไปอย่างเห็นได้ชัด อาทิเช่น การทำยอดขายให้ได้ประมาณ 250,000-300,000 ลิตรต่อสถานีต่อเดือนเพื่อให้ถึงจุดคุ้มทุน เป็นสิ่งที่ทำได้ยากขึ้นเรื่อยๆ สำหรับสถานีบริการส่วนใหญ่ นอกจากนี้ แนวโน้มของค่าใช้จ่ายในด้านต่างๆ ที่สูงขึ้น เช่น ค่าแรง ค่าไฟฟ้า ค่าเช่าสถานี และ ค่าของแจกของแถม ยังทำให้สถานีบริการส่วนใหญ่ไม่สามารถอยู่รอดด้วยการให้บริการน้ำมันเพียงอย่างเดียว และ ต้องหันไปหารายได้เสริมจากบริการอื่น เช่น ร้านค้า และ บริการล้างรถ เป็นต้น

ความคิดเห็นของผู้บริโภคต่อการเปิดเสรีตลาดน้ำมัน

ผลของการสำรวจความคิดเห็นของผู้บริโภคได้ยืนยันผลดีของการเปิดเสรีดังกล่าวข้างต้น กล่าวคือ *ผู้บริโภคกว่าร้อยละ 95 เชื่อว่า ตลาดค้าปลีกน้ำมันเป็นตลาดที่มีการแข่งขันสูง ร้อยละ 77 เชื่อว่า การเปิดเสรีส่งผลให้อุตสาหกรรมมีการเติบโตในแง่ของการเพิ่มจำนวนสถานีบริการ ร้อยละ 75 กล่าวว่า การให้บริการดีขึ้นภายหลังจากการเปิดเสรี เมื่อประเมินผลกระทบโดยรวมแล้ว ผู้บริโภคร้อยละ 37 เชื่อว่า การเปิดเสรีทำให้ผู้บริโภคได้ประโยชน์ ในขณะที่ร้อยละ 26 เชื่อว่า การเปิดเสรีทำให้คนเสียประโยชน์ และ ร้อยละ 26 เชื่อว่า ตนไม่ได้รับผลกระทบจากการเปิดเสรี*

ตารางที่ 1 สรุปผลกระทบของการเปิดเสรีตลาดน้ำมันต่อผู้บริโภค อุตสาหกรรมน้ำมัน และสังคมโดยรวม

กล่าวโดยสรุป ผลการวิจัยชี้อย่างชัดเจนว่า การเปิดเสรีตลาดน้ำมันในประเทศไทย เมื่อปี 2534 ได้ก่อให้เกิดผลกระทบในด้านบวกอย่างมหาศาลต่อทั้ง การลดความสูญเสียของสังคมในรูปแบบต่างๆ การลดการผูกขาดของอุตสาหกรรมค้าปลีกน้ำมัน ซึ่งทำให้เกิดการแข่งขันอย่างดุเดือดทั้งในด้านการแข่งขันทางราคาและการแข่งขันในการให้บริการอื่นๆ ซึ่งเป็นสิ่งที่นำประโยชน์มาสู่ผู้บริโภคทั้งสิ้น นโยบายตลาดเสรีจึงเป็นนโยบายที่ควรคงอยู่ และ ได้รับการผลักดันต่อไป ในทางกลับกัน การหันกลับไปใช้นโยบายควบคุมอย่างเข้มข้นในรูปแบบใดๆ นอกจากจะเป็นสิ่งที่ไม่มีประสิทธิผลแล้ว ยังจะก่อให้เกิดความสูญเสียทางสังคม และทำลายความเชื่อมั่นของนักลงทุนอีกด้วย

ตารางที่ 1 สรุปผลกระทบของการเปิดเสรีตลาดน้ำมัน พ.ศ. 2534

ผลกระทบ		ก่อนเปิดเสรี	หลังเปิดเสรี
ผลกระทบต่อผู้บริโภค	เสถียรภาพทางราคา	ไม่มีเสถียรภาพระยะยาว และ ก่อให้เกิดการตื่นตระหนกในหมู่ผู้บริโภคเมื่อปรับราคา	มีเสถียรภาพระยะยาว ผู้บริโภคเคยชินต่อการเปลี่ยนแปลงราคาทำให้ไม่ตื่นตระหนก
	ความแตกต่างทางราคา	ไม่มีความแตกต่างทางราคา เนื่องจากถูกควบคุมราคา	มีความแตกต่างทางราคา ตั้งแต่ 3-5 สต. ไปจนถึงกว่า 1 บาทต่อลิตร ทำให้ผู้บริโภคมีทางเลือกในการรับบริการในราคาที่ถูกกว่าได้
	ความสะดวก และบริการ	ไม่สะดวก เนื่องจากมีสถานีบริการน้ำมันน้อย และ บริการไม่ดี เนื่องจากไม่มีการแข่งขัน	สะดวกเนื่องจากมีสถานีบริการอยู่ทั่วไป และ บริการดีขึ้นอย่างเห็นได้ชัด ทั้งการมีห้องน้ำสะอาด ร้านค้า และ ของแจกของแถม
	การประเมินโดยรวม	ร้อยละ 95 ของผู้บริโภคเชื่อว่า ตลาดน้ำมันมีการแข่งขันกันสูง และ ร้อยละ 75 รู้สึกว่าสถานีบริการน้ำมันมีบริการที่ดีขึ้น ซึ่งเป็นผลจากการเปิดเสรี นอกจากนี้ ผู้บริโภคที่คิดว่าการเปิดเสรี ทำให้ตนได้ประโยชน์มากขึ้นมีมากกว่าผู้ที่คิดว่า การเปิดเสรีทำให้ตนเสียประโยชน์	
ผลกระทบต่ออุตสาหกรรมน้ำมัน	โครงสร้างอุตสาหกรรม	มีการกระจุกตัวสูง แสดงถึงการมีการแข่งขันน้อย กล่าวคือ บริษัทน้ำมันรายใหญ่ที่สุดสี่ราย มีส่วนแบ่งของสถานีบริการถึงร้อยละ 89	มีการกระจุกตัวน้อยลง บริษัทน้ำมันรายใหญ่ที่สุดสี่ราย มีส่วนแบ่งของสถานีบริการลดลงเหลือร้อยละ 37 แสดงถึงการแข่งขันที่มากขึ้น
	จำนวนสถานีบริการน้ำมัน	มีสถานีบริการน้ำมัน 3,473 สถานี (ปี 2534) อัตราการเพิ่มขึ้นของจำนวนสถานีร้อยละ 4-5 ต่อปี	มีสถานีบริการน้ำมัน 10,874 สถานี (ปี 2540) และ มีอัตราการเพิ่มขึ้นโดยเฉลี่ยร้อยละ 25 ต่อปี (ปี 2535-2539)
	ยอดขายต่อสถานี	296,000 ลิตรต่อเดือนต่อสถานีบริการของบริษัทน้ำมันรายใหญ่	ลดลงเหลือ 247,000 ลิตรต่อเดือน
	ค่าการตลาดและกำไร	ค่าการตลาดถูกควบคุมแต่ยังมีกำไรเนื่องจากมีการแข่งขันน้อย	ค่าการตลาดสูงขึ้น แต่กำไรลดลงเนื่องจากมีการแข่งขันมากขึ้น และ ต้นทุนสูงขึ้นมาก สถานีบริการหลายแห่งต้องหารายได้เสริมจากบริการอื่นๆ
ผลกระทบต่อสังคมโดยรวม	ประสิทธิภาพในการจัดสรรทรัพยากร	กองทุนน้ำมันทำให้เกิดการบิดเบือนราคา ซึ่งทำให้เกิดความสูญเสียประสิทธิภาพของตลาด โดยความสูญเสียในการบริโภคเมื่อปี 2533 ปีเดียวสูงถึง 640-1,300 ล้านบาท	ความสูญเสียจากการบิดเบือนราคาลดลง เหลือเฉพาะการบิดเบือนราคาในตลาด LPG ซึ่งจะหมดไปเมื่อรัฐบาลปล่อยให้ราคาของ LPG ลอยตัว
	อื่นๆ	เกิดอุบัติเหตุอันเนื่องมาจากการปลอมปนน้ำมันบ่อยครั้ง และ มีการดัดแปลงเครื่องยนต์อย่างกว้างขวาง	รายงานการเกิดอุบัติเหตุเนื่องจากการปลอมปนน้ำมันลดลงมาก และ แทบไม่มีการดัดแปลงเครื่องยนต์อีก

Executive Summary

The Economic Impact of the Liberalization of Oil Market

Since the first oil shock in 1973, oil pricing has become a very sensitive policy issue. Past governments have thus implemented various measures to stabilize domestic oil prices in order to avoid political backlashes. Oil prices were subsequently placed under government control, and the Oil Price Stabilization Fund was established in 1977 as a major tool to maintain price stability. Although the Fund to some extent helped stabilize domestic oil prices, it inadvertently created many problems, such as a distorted pattern of consumption, illegal dilution of oil products, and a delay in the development of alternative indigenous energy resources.

To reduce the adverse affects of the stabilization measures, a major price liberalization policy was introduced in 1991. Table 1 compares the oil price regulatory regimes before and after liberalization. After seven years of implementation, the liberalization policy is now widely believed in academic and business circles to have had a positive impact on the oil industry and to have generated net gains for consumers and tax payers. The general public seems to disagree, however, as the policy impact is not fully understood. There are several myths with regard to liberalization. For example, there are claims that since liberalization, the adjustment of domestic oil prices has become sensitive to an upward movement in the world price, but sluggish in response to a downward movement. This reflects opportunistic behavior on the part of oil companies. There is also a belief that liberalization has resulted in a general increase in production and service costs. Among the various arguments against liberalization, the issue of equity is often raised. For example, some have argued that, to create equity among regions, a single-price policy should apply nationwide.

Although not all the myths are widely held, those that attracted attention have caused some confusion among consumers. The danger is that, if such myths are held by policy makers or a majority of consumers, they can become an obstacle to further liberalization, or could even lead to a policy reversal.

Table 1 Comparison of Oil Price Regulatory Regimes before and after Liberalization

	Pre-liberalization Period	Post-liberalization Period
Ex-refinery or Import Price	Approved by the Petroleum subcommittee based on Singapore weekly price	Determined by the domestic refineries based on Singapore spot price. Generally, changes once a week.
Excise and Municipal Tax	Determined by the Ministry of Finance	Determined by the Ministry of Finance
Oil Fund Contribution	Approved by the Petroleum subcommittee. Generally changes once a week.	Fixed at 3 satang per liter for most products.
Energy Conservation Fund Contribution	Not existed.	Fixed. Applied since November 1, 1992
Marketing Margin	Fixed and approved by the Petroleum subcommittee	Determined by each oil company

The major goal of this research is to dispel these myths and to consider the impact of the oil market's liberalization objectively from the public interest point of view. In particular, we focus on three issues which are key public concerns:

1. The impact of liberalization on the stability of the oil price and the speed of price transmission.
2. The impact of liberalization on resource allocation efficiency. The study focuses, in particular, on three sub-topics, namely, the evaluation of the impact on major economic sectors, the impact on consumption efficiency, and the assessment of the validity of the single oil price policy.
3. The impact of liberalization on the structure of the oil market and the conduct and performance of oil companies and dealers.

The rest of this summary will highlight major findings concerning the above topics.

THE IMPACT ON PRICE STABILITY

We begin our analysis by assessing the effectiveness of the price stabilization scheme through the establishment of the Oil Fund. In assessing the effectiveness, we propose a price stability index that measures the degree of fluctuation of the domestic price relative to that of the world price. We find that:

- Price control through the Oil Fund was quite effective when there were small fluctuations in the world price, as evidenced by relatively stable prices during most of the period before liberalization.
- Price control became ineffective, however, when the world price changed drastically during the first half of 1991. Apparently, the ineffectiveness of the Oil Fund in stabilizing the oil price and the depletion of the Oil Fund Reserve were two compelling reasons for the government to liberalize the market.

From the finding, it can be concluded that, contrary to popular belief, price liberalization helps stabilize domestic oil prices in the long run.

THE IMPACT ON THE SPEED OF PRICE TRANSMISSION

Concerning the speed of oil price transmission, we have constructed an econometric model to test whether the speed of the transmission has been changed by the liberalization and whether the domestic oil price responds equally to the rise and fall in world market prices. From the analysis, we learn that:

- Before liberalization, Bangkok retail prices did not seem to respond to changes in Singapore prices. This is hardly surprising since the domestic price was controlled by the government.
- After liberalization, however, the domestic retail prices of all oil products became sensitive to the world price. Contrary to popular belief, after liberalization, the speed with which the domestic price changes in response to both upward and downward global price movements is virtually the same for gasoline, diesel and fuel oil.
- The domestic oil price in 1997 was more responsive to the world price than in the period immediately following liberalization, reflecting that the market has become even more competitive.

Thus, the popular claim about the opportunistic behavior of the oil companies is unfounded. The reason is that, in a competitive market, there is no room for oil companies to take advantage of consumers.

THE IMPACT ON MAJOR ECONOMIC SECTORS

We also analyze the impact of the liberalization policy on key economic sectors. The focus is to identify sectors that are sensitive to oil price changes and thus are affected by the liberalization policy. Based on the cost structure of each sector, we find that:

- The sectors with the heaviest use of oil products, especially diesel, include sea, land and air transportation, fishery, mining, agricultural services—e.g., irrigation and cooperative activities—and electricity generation and distribution. The percentage share of cost of oil to the total cost in these sectors ranges from 14 percent for electricity generation and distribution to 31 percent for sea transportation.

- These sectors have been less negatively affected by liberalization than it would appear, referring only to the above percentages. For example, if the price of diesel rose by 1 percent, the cost of sea transportation would rise by less than 0.31 percent. This is for two reasons. First, every sector also consumes gasoline, which has become relatively cheaper since liberalization. Second, when prices rise, consumption falls, dampening the impact of price increases.

- Gains accrue to certain individuals, such as passenger car owners, who benefit from relatively cheaper gasoline. However, the collective gains of these individuals cannot be estimated.

THE IMPACT ON CONSUMPTION EFFICIENCY

Theoretically speaking, resource allocation is most efficient when the market is allowed to operate freely. Deviations from the free market system due to government intervention will lead to efficiency losses in both consumption and production. Based on this concept, we estimate the efficiency gain resulting from liberalization, and show that society as a whole gains significantly. In particular, we show that:

- The benefit due to the correction of price distortion from the consumption side alone is estimated to be between 640 and 1,300 million baht per year at the 1990 consumption level. This is equivalent to 0.55-1.12 percent of total market sales.

- The above estimation is very conservative because certain benefits accrued to producers are ignored. These include the benefits gained from reducing the burden of exporting excess gasoline and the interest burden that had been associated with frequent delays in Oil Fund refunds, etc. Due to a lack of information, we do not attempt to estimate these benefits.
- Other benefits accruing to society cannot be easily quantified. These range from the decrease in oil product adulteration, which had caused serious harm to humans and property, the decreases in the costs of adapting or changing car engines to be usable with cheap products by the car owners, etc.

Thus it is clear that, in terms of economic efficiency, liberalization has brought about tangible and significant benefits to consumers, producers, and society as a whole.

THE VALIDITY OF THE SINGLE PRICE POLICY

A policy that would set a single price for each oil product nationwide was once proposed to create greater equity among regions. In this study, we show that:

- The proposed single price policy for each oil product can be approximated to the average price in each province weighted against their respective consumption volumes. The single-price policy thus entails higher retail prices in Bangkok and nearby provinces and lower prices in distant provinces. Consequently, the policy may have a positive income distribution effect.
- Unfortunately, the policy would result in price distortions, which entail an efficiency loss to society of 6.5 million baht per year, when two products, i.e., premium gasoline and high-speed diesel, are taken into account. A more significant loss, however, would arise from the administration costs of implementing the policy, which could be as high as 45 million baht per year.
- The policy would be inefficient in achieving its intended goal of promoting equity. This is because while the policy may succeed in targeting many provinces with low income levels, it also subsidizes many provinces with high income levels. Even within the subsidized provinces, the policy would indiscriminately subsidize both the rich and the poor.

Thus there is no justification for supporting the single price policy. More broadly, our study also rejects the validity of any policy that creates price distortion according to location, including one currently being implemented.

THE IMPACT OF LIBERALIZATION ON THE RETAIL MARKET

To ascertain the impact of liberalization on the retail market, we have compiled some data, interviewed oil companies, and conducted surveys on retail stations and consumers. We focus on three main aspects of the impact: The industry's structure, conduct and performance. Industry structure concerns the number of companies in the business, their relative network size and the sales volume per station. Industry conduct includes price and non-price competition. Finally, industry performance concerns sales volume and profitability.

THE IMPACT ON THE INDUSTRY STRUCTURE

Concerning the impact of liberalization on the retail industry structure, we find that:

- At the time of liberalization in 1991, there were 3,473 retail stations in Thailand. The four major oil companies, i.e., PTT, Shell, ESSO and Caltex, had a combined retail station share of 88.9 percent (See Figure 1a). The growth rate of the retail stations at that time was about 4-5 percent per year. This amounts to 150-200 stations being added to the distribution network annually.
- The years after liberalization have witnessed continuing high growth rates of the retail station expansion, with an average annual growth rate of 20.9 percent. This is equivalent to the annual increase of 1,233 stations since deregulation. As a result, the total number of stations had risen to 10,874 in the first half of 1997.
- By 1997, the combined retail station share of the four majors had fallen to 36.7 percent as the share of Article 6* newcomers' had expanded from 3.8 percent in

* Article 6 of the Oil Act 1978 requires any oil company with a total annual sales volume more than 0.1 million tons to get a special license to operate.

1991 to 27.4 percent. The share of non-Article 6 companies had also grown rapidly from 7.3 percent in 1991 to 35.97 percent in 1997 (See Figure 1b). This indicates that the market has become much more competitive after liberalization.

- Apart from market forces, efforts by the Public Works Department to register informal non-Article 6 stations, e.g., skid tank stations, for safety regulation, may partly explain the rapid growth in the number of stations.
- As a result of the high growth, average throughput per station of the five major brands, including Bangchak, has fallen from 296,600 liters per month in 1992 to 246,860 liters per month in 1997. Average throughput per station of non-major Article 6 stations is believed to be lower than that of the major brands.

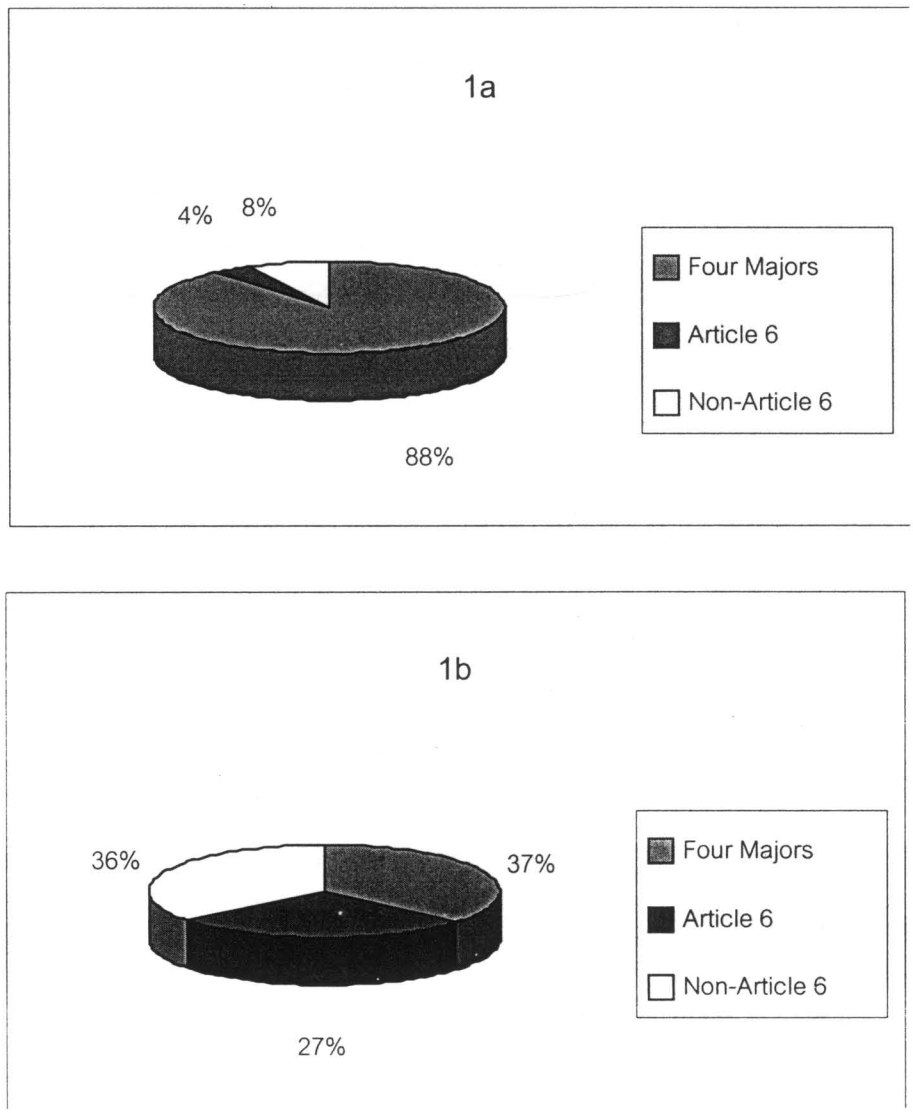
Thus the market has become much more competitive with regards to the number of companies in business, the expansion of retail networks, the less concentrated share of distribution channels, and the tougher environment in which to obtain sustainable throughput for retail stations.

THE IMPACT ON PRICE COMPETITION

One major impact of liberalization has been the emergence of price competition among traders and retail stations. Concerning this, the survey reveals that:

- Price gaps of the major brands are observed to be as small as 3-4 satang per liter for most products. Thus, it seems that price cutting is clearly not an intended tool to promote sales among major brands. In fact, retail stations are discouraged, if not prohibited, to cut prices. In areas with heavy price competition, however, major brands may try to match the prices of low price competitors. In that case, dealers are normally asked to share the 'cost' of price cutting.
- Some small foreign brands, e.g., Jet, are quite active in cutting prices to gain customers. Significant price cutting can be very effective in gaining sales volume, provided that others do not try to match the price. For a small foreign brand, being a company-operated station has an advantage over a dealer-operated station in a price war.

Figure 1 Station Shares before (a) and after (b) Liberalization



- Independent Thai stations normally set their prices slightly lower than those of major brands. Significant price cutting is not often found, especially in dealer-operated stations. However, some TPI and MP company-operated stations may decide to cut prices.
- For a skid tank station, price cutting is a usual practice in attracting consumers. In highly competitive areas, the price gap among these outlets can be as wide as 20-30 satang per liter.

In summary, different pricing strategies demonstrate a positive sign of the market that will eventually benefit consumers. This should be taken as a major achievement of liberalization.

THE IMPACT ON NON-PRICE COMPETITION

In addition to price competition, non-price competition has become an ordinary practice in the retail market. The survey interestingly shows that:

- Usual forms of non-price competition among retail station are good forecourt services, credit, cleanliness, free give-aways, complete car care services and quick and convenient customer service facilities.
- Forecourt services are difficult to improve because of acute manpower shortages, with a high rate of turnover in most areas.
- Credit has been an effective way to gain volume and to establish a base of regular customers. However, giving credit can entail high risk.
- Cleanliness has become increasingly important and many major brands' stations are built without car wash, car repair, tire repair, or other car care services that may affect cleanliness of the stations.
- Free give-aways have become a normal expectation of consumers. Giving away gifts is not to raise sales volume but to prevent them from falling off as competitors regularly give away things to customers.
- Quick and convenient customer service facilities, such as mini-marts and restaurants, have not only attracted customers to stations, but also are major sources of station revenues. Competition in this regard will certainly expand.

Although the real benefits of some forms of non-price competition, especially the give-aways, can be debatable, non-price competition is a clear sign of a healthy market since it provides consumers with many choices to fit their needs.

THE IMPACT ON SALES AND PROFITABILITY

It is widely believed among economists that, in a competitive market, it is impossible for a company to make more than normal profits. Our survey strongly confirms the belief:

- The retail oil business is clearly not highly profitable for most station owners. Sales volumes of 250,000-300,000 liters a month are required just to cover the

operating expenses of a retail station. This level of monthly throughput is becoming harder to achieve in many areas.

- The major expenses of a retail station are labor costs, electricity charges, costs of give-away gifts and rental fees. Labor costs alone exceed 100,000 baht a month for a medium size station with 20 workers. Electricity costs usually exceed 20,000 baht a month, excluding convenience (CV) stores. Free gift costs are shared with oil companies. However, the cost share of the station owner is about 4-5 satang per liter. Station rent varies among stations depending on investment conditions. The range is between a few thousand to several hundred thousand baht a month.
- Average margins for leased stations are between 30-35 satang per liter. Dealer-owned stations may earn about 60-65 satang per liter while high-volume stations may receive extra rebates of 10-30 satang per liter.
- For most stations in the survey, the margins from fuels are just enough to cover operating expenses. Profits are earned from non-fuel income. Main income earners are CV stores and car washes. The average gross CV store margin is 18 percent. Monthly franchise fees, if any, run between 3-7 percent of sales revenues. Rising operating costs and stronger competition make it necessary to seek income from non-fuel services if the station is to survive. However, non-fuel services are not money makers for all stations.

CONSUMERS' PERCEPTION OF THE IMPACT

We conducted a survey of 312 consumers to seek their opinions concerning the effects of the oil price deregulation. The sample consists of passenger-car, pick-up truck, truck, bus, and motorcycle drivers. From the survey, we find that:

- The most significant factors affecting a consumer's decision to buy from a particular brand are oil product quality (38 percent responding), location and convenience (18 percent responding) and oil price (15 percent responding). On the other hand, free gifts were said to be insignificant. The finding contrasts with that of the retail station survey that shows that they are an effective marketing tool.

- About 60 percent of the consumers notice price differences at retail stations and believe it to be between 1-25 satang per liter. However, only 30 percent of the consumers usually seek low priced stations.
- 95 percent of the consumers are convinced that oil retailing is a competitive business. 77 percent observe that deregulation has resulted in the growth of retail stations and 52 percent notice that the policy has made competition stronger. On the other hand, 65 percent believe that deregulation has made prices higher. 75 percent of consumers mention that services have improved since deregulation and 39 percent believe that oil quality has improved.
- For the overall evaluation, 37 percent of the consumers believe that the deregulation has made them better off, 26 percent say they are worse off, while another 26 percent responded that they are unaffected. About 70 percent also say that they have not changed their consumption behavior since deregulation

From the survey, we can conclude that most consumers believe that the liberalization has brought about many benefits to them. Concerning oil prices, however, they somehow believe that oil prices have risen since liberalization. This may help explain the origin of many myths previously mentioned and emphasize the importance of an objective evaluation of the policy and a better public relations effort.

Table 2 summarizes the major impact of the oil market liberalization on consumers, the retail industry, and society.

With the above objective and systematic evaluation, we have shown that the 1991 liberalization has been successful in creating a much more competitive oil market. This in turn has brought about several benefits to consumers and society as a whole. Further liberalization in areas that are still under government control is thus worth consideration.

Table 2 Summary of the Impact of Oil Market Liberalization

Impact on		Pre-liberalization Period	Post-liberalization Period
Consumers	Price Stability	Short-term price stability with occasional discrete jumps which usually cause panic among consumers.	Fluctuating prices with rare discrete jumps. No panic observed as consumers are accustomed to continual price adjustment.
	Price Diversity	No diversity as prices are controlled.	Price differences among stations range from a few satang to over 1 baht per liter in highly competitive area. Consumers have alternatives of where to get services.
	Convenience	Inconvenient since stations are few and far between.	Convenient since stations can be found almost in every corner.
	Service	Poor forecourt and other types of services due to limited competition.	Better forecourt and other types of services, e.g., clean toilet, convenience store, etc. Handing out free gifts has become a normal practice.
	Overall Assessment	37 percent of the consumers believe that the liberalization has made them better off, 26 percent say they are worse off, while another 26 percent responded that they are unaffected	
Retail Industry	Industry Structure	Highly-concentrated; the four "major" oil companies own 89 percent of the stations.	More competitive; the four "major" oil companies' share has fallen to 37 percent as new competitors entered the market.
	Number of Service Stations	Increased 4-5 percent per annum on average during 1991-1993. There were only 3,473 service stations in 1991.	Increased 25 percent per annum on average during 1991-1996. The number of stations reached 10,874 in mid 1997.
	Sales Volume per Station	296,000 liters per month per station for stations belonging to a "major" oil company.	247,000 liters per month per such station.
	Margin and Profitability	Low and controlled margin but was profitable due to limited competition.	Higher margin but lower profitability due to greater competition and higher cost. Most stations are not profitable without convenience store and other value-added services.
The Society	Economic Efficiency Loss	Price distortion is estimated to result in an efficiency loss of approximately 640-1,300 million baht per year due to consumption distortion and a comparable size of loss due to production distortion.	Efficiency loss is minimal. Price distortion remains only in the LPG market in which further liberalization is required.
	Other Losses	Frequent accidents caused by illegal dilution and adulteration of oil products.	Very few reports of accidents caused by tainted oil products.

The Economic Impact of the Liberalization of Oil Market

Chapter 1

Introduction

Since the first oil shock, oil pricing has become a very sensitive policy issue. Past governments have thus implemented various measures to stabilize the domestic oil prices in order to avoid political backlashes. Oil prices were then placed under the government control, and the Oil Price Stabilization Fund was established as a major tool to maintain price stability. Although the Fund had helped stabilize short-term domestic oil prices, it inadvertently created many problems such as a distortive pattern of consumption, illegal dilution of oil products and a delay in the development of alternative indigenous energy resources.

To reduce the adverse effects of the stabilization measures, a major price liberalization policy was introduced in 1991. The policy is widely believed among the academic and business circles to have had a positive impact on the oil industry and generated net gains to consumers and tax payers. The general public seems to disagree, however, as the policy impact is not fully understood. There are several myths with regard to liberalization. For example, there are claims that after the liberalization, the adjustment of domestic oil prices is sensitive to an upward movement in the world price, but sluggish in response to a downward movement. This reflects an opportunistic behavior on the part of oil companies. There is also a belief that liberalization has resulted in a general increase in production and service costs. Among the various arguments against liberalization, the issues of equity is often raised. For example, some have argued that, to create equity among regions, a single-price policy should apply nationwide.

Although not all the myths are widely held, those that attracted attention have caused some confusion among consumers. The danger is that, if such myths were held by policy makers or a majority of consumers, they can become an obstacle for further liberalization or can even lead to a policy reversal.

1.1 Objective and Scope of the Study

The objective of this study is to dispel the above myths and consider the impact of oil market liberalization objectively from the public interest point of view. In particular, we focus on three issues which are public concern:

1. The impact of the liberalization on the stability of the oil price and the speed of price transmission.

2. The impact of the liberalization on resource allocation efficiency. The study focuses, in particular, on three sub-topics, namely, the evaluation of the impact on major economic sectors, the impact on consumption efficiency and the assessment of the validity of the single oil price policy.

3. The impact of the liberalization on the structure of the oil market and the conduct and performance of oil companies and dealers.

1.2 Research Methodology

In this study, we employ a set of research methods. In analyzing the impact of the liberalization on oil prices, we adopt econometric and statistical analysis that make use of oil price data gathered by the National Energy Policy Office (NEPO) and other government organizations. In evaluating the impact of the liberalization on consumption pattern, we apply a standard economic theory to estimate efficiency gains in oil consumption based on data collected by the National Economic and Social Development Board (NESDB), NEPO and other various sources.

Concerning the impact of the liberalization on retail industry structure, library research is used to obtain basic information, e.g., changes in the number of retail station and retail sales volume. We also interview oil company executives to understand the overall strategy of the companies. Companies interviewed include major oil companies, e.g., PTT, Esso, Bangchak and independent oil companies, e.g., Jet and MP. In addition, we also conduct two field surveys, i.e., retail station survey and consumer survey, to get

an in-depth understanding of the impact of the liberalization on the industry conduct and performance.

The surveys are conducted during the first half of 1997. The retail station survey covers 142 stations distributed in five regions, i.e., Bangkok, Central, Northern, Northeastern and Southern regions. The number of stations to be surveyed in each region is initially determined to be proportional to the number of stations in the region. For each region, representative provinces are selected. Each province is then divided into urban, main highway and rural zones. After that, an area is randomly selected from each zone. If possible, all retail stations in the selected area would be covered. In this way, we could observe pricing and other forms of competition among the stations. Among the stations surveyed, 42 are city station while 100 are suburb or highway stations. As for brand distribution, 92 are major brands, 24 are foreign and independent brands, 4 are co-op stations and 12 are skid tank stations.

For consumer survey, the areas to be covered are the same as those of the retail stations. For each area, vehicle drivers are randomly selected from local markets, city streets, shopping centers, offices and other public places. Among the 312 consumers interviewed, 31% are in Bangkok Metropolitan area, 13% in the Central region, 23% in Northern region, 12% in Eastern region and 21% in the Southern region. As for vehicle types, 46% are pick-up trucks, 23% are cars, 16% are motorcycle and 14% are buses or trucks.

1.3 Structure of the Report

The report is divided into eight chapters. Chapter 1 reviews background of the study, outlines the objectives and the scope of the research and describes the methodology. In Chapter 2, we review important regulations in the oil industry to provide background information for the readers. Then the impact of liberalization on oil price is analyzed in Chapter 3. Particularly, we focus on two issues. First, the impact of the liberalization on oil price stability is discussed. The question is: "has oil price become less stable after the liberalization?". Then the impact of the liberalization on the speed of price

transmission is analyzed. The question is: "have oil companies responded differently to changes in world price during the upward and downward trends?".

In Chapter 4, we analyze the impact of the liberalization on oil consumption pattern, focusing on three issues. First, we discuss the impact of the liberalization on key economic sectors to identify the sectors heavily affected by the floating of oil price. Second, we analyze the impact of the liberalization on consumption efficiency by quantifying the benefits gained from the removal of price distortion. Third, we discuss the impact of the hypothetical single-price policy, one that aims at setting the same price for each product countrywide. In analyzing three issues, one question is specifically relevant: "what is the economic burden of price distortion due to regulation?".

In Chapter 5 and Chapter 6, we discuss the impact of the liberalization on the retail market based on survey results. While the former chapter evaluates the impact from oil company and retail station perspective, the latter looks at it from the consumer perspective. Chapter 7 discusses some policy recommendations and concludes the study.

Chapter 2

Oil Market Regulation in Thailand

This chapter serves as background to the following chapters. It will describe some important regulations in the Thai oil industry. By regulation, we mean any kind of government intervention in the market. The goal of regulation can be economic, or to achieve supply security or protect the environment. This chapter will conclude with a brief review of the liberalization experience of the US oil market, which is considered to be the most liberal in the world.

2.1 Economic Regulations

Among the various types of regulatory tools, price regulation, which includes price control and monitoring, taxation and subsidies, was most common in the oil industry. It is also central to this study. Thus, we will discuss price regulation in details. Other types of regulation such as that concerned with market entry will be described briefly.

Price Regulation

From early 1970s to late 1980s, the Thai economy suffered severe blows from the sharp rise in world oil prices during the two oil crises. The first oil crisis, which began in 1971, was a result of a price collusion among OPEC members. At the Tehran Agreement, OPEC raised the posted price of Persian Gulf crude by 35 per cent a barrel, which sent shock waves throughout the world. The second crisis occurred as a result of a shortage of supply of crude oil following the revolution in Iran in 1978. At the time, the Iranian oil production fell from 5.8 million barrels per day to only 0.5 million barrels. The fall in production led to a 20 per cent rise in the oil price in April 1979. Again, the crisis caused a world-wide economic turmoil.

As in other countries, oil products are considered to be essential commodities in Thailand. Thus, oil prices were controlled to protect the consumers from opportunistic producers and to stabilize the domestic price from fluctuation in the world market price due to crises and seasonal fluctuations. The price regulatory policy in Thailand can be divided into two periods: the pre-liberalization period and the post-liberalization period.

Price Regulation in the Pre-liberalization Period

Before the 1991 liberalization, the government regulated both the ex-refinery and retail oil prices. A common ex-refinery price is set for every domestically refined oil product. This price is based roughly on the domestic price of the equivalent imported product. To obtain the retail price, applicable taxes, the oil fund contribution and a fixed marketing margin are added to the ex-refinery price. The formula for calculating the retail price of oil products sold in Bangkok is as follows:

Bangkok retail price = Controlled ex-refinery price (or import price) +

excise tax + municipal tax + sales tax +

controlled marketing margin + Oil Fund contribution

The controlled retail prices for products sold outside Bangkok are higher that those sold in Bangkok to allow for transportation costs. This basic pricing structure had been in use since the first oil crisis in the early 1970s. Many major changes in the structure were made since then, especially after the second oil crisis. Specific developments in the pricing of oil products since the second oil crisis are as follows:

Ex-refinery and National Import Prices. In 1980, the government established a set of ex-refinery prices for various oil products based loosely on the average posted prices of similar products quoted by six refining companies in Singapore consisting of Shell, Mobil, British Petroleum, Esso, Caltex and Singapore Refining Corporation. The government appointed a working group -- whose members consisted of officials from various concerned government agencies -- to monitor the movement of the posted prices as announced by the refineries in Singapore. The group was provided with government policy guidelines concerning when and how the ex-refinery prices are to be adjusted. Although the ex-refinery prices were usually based on the average Singapore postings, the government occasionally deviated from this practice by using the minimum or maximum postings instead. The use of Singapore posted prices as the reference for the setting of local refinery prices in Thailand was aimed at ensuring that Thai refineries operate competitively. At the same time, however, to provide for flexibility in the system and to cushion the impact of drastic oil price changes on local refineries, an oil-price stabilization fund was established.

Taxes and Oil Fund. The main objective of the Oil Price Stabilization Fund (hereafter the Oil Fund) was to stabilize domestic retail oil prices in face of short-run fluctuations in world oil prices. Thus, when world oil prices were rising, the government would use the oil fund to subsidize domestic oil prices to keep retail prices constant. On

the other hand, when world oil prices were falling, the oil companies were required to pay a levy to build up the Oil Fund reserves.

Since taxes and marketing margins were not frequently adjusted as changing the tax rate is administratively cumbersome, the oil fund acted as the main balance in maintaining the retail oil prices in Thailand. Revenues generated from contributions, which went directly into the oil fund reserves, could only be used to subsidize domestic oil prices when needed. On the other hand, revenues generated from various taxes including the excise tax, the import tax and the municipal tax flowed into the government treasury[1].

Marketing margins and transportation cost. The government set a marketing margin for each controlled product. The margin was intended to cover the oil company's cost of operations, which include storage, overhead and normal profits. Like taxes, marketing margin were not frequently changed. The oil companies occasionally submitted requests for marketing margin adjustments, but the government often turned them down. The government allowed only two market margin increases during 1980-1987. Adjustments of the marketing margins for the oil companies had normally been a sensitive political issue since a margin increase usually means a higher retail price for consumers while providing benefits to oil companies which were mostly foreign multinationals.

For the up-country transportation cost, the government established a set of official transport charges which were added to the Bangkok price to obtain the up-country selling price. The distribution allowances were supposedly based on the most economical mode of transportation to that particular location. In practice, however, the government had not been keeping up with transportation developments, resulting in unrealistic cost for many locations. For example, local oil companies in Thailand had long been importing oil products from the nearby refineries in Singapore for their sales in the country's southern region. However, the calculation of official transport charges for the region were still based on products delivered from Bangkok which were much higher than the oil companies actually paid. The end result was that the retail oil price in the country's southern region was often too high.

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[1] Among all the taxes, excise tax was the highest.

Price Regulation in the Post-Liberalization Period

Although the Oil Fund was introduced to protect the consumers and to stabilize the domestic oil price, it was subjected to political interference from various interest groups. Consequently, oil prices were often dictated by other reasons rather than purely economic ones. One major problem is that price intervention has resulted in some oil products such as diesel, LPG and fuel oil being under-priced, while others such as gasoline being overpriced. This has caused a distortive consumption pattern and created many problems such as illegal adulteration of oil products or the costly conversion of car engines into those using LPG or diesel instead of gasoline. Furthermore, the stabilization policy became unsustainable as a result of a continual increase in the world market price which quickly drained the Oil Fund reserve. This had alerted the government to consider liberalizing the oil market.

The idea to decontrol oil prices first appeared officially in the sixth National Economic and Social Development Plan (1987-1991). The deregulation was initiated by the National Energy Policy Office (NEPO) -- then a unit in the National Economic and Social Development Board, (NESDB) -- and was supported by the private sectors. The liberalization was a gradual one which began with the government's decision to ease control on imports. The licensing method prescribed by the Article 6 of the Petroleum Act was revised to allow more oil traders into the market. Later, the cabinet decided to allow domestic oil prices to be "semi-floated" in June 1991 and to be "floated" in August 1991.

The semi-floated price system began by the decontrol of the retail price in the Bangkok Metropolitan Area and in other areas where the retail market was competitive so that price regulation was unnecessary. As the semi-floated price system proved successful, the government then introduced the floated version by completely lifting the retail price control and reducing the role of the Oil Fund to a minimal level. The Fund was used only to subsidize LPG (also used as cooking gas), which was considered a basic essential, hence a sensitive product.

Thus, domestic prices of most oil products are now allowed to fluctuate in accordance with the world price. After the liberalization, in 1992 the Energy Conservation Fund was established by the Energy Conservation Act. The purpose of the Fund is to finance activities promoting conservation of energy. In the same year, the sales tax was replaced by the value added tax. Although the excise tax remained in place, it became a tool to promote the use of clean fuel rather than a major source of government revenues as was the case in the past. Therefore, unleaded gasoline is taxed at a lower rate than the leaded gasoline.

As a result of these developments, the domestic price is now the sum of the ex-refinery price (or import price), excise and municipal taxes, the marketing margin, the Oil Fund contribution, the Energy Conservation Fund contribution and value added tax (VAT) as follows:

Bangkok retail price = Ex-refinery price (or import price) + excise tax

+ municipal tax + marketing margin

+ Oil Fund contribution

+ Energy Conservation Fund contribution + VAT

Table 2.1 compares price setting regulation before and after the 1991 liberalization.

Although oil companies are now free to set their own prices under the new system, the government continued to intervene in the market by a different means. Service stations are still obliged to post its retail price in front of the stations and report their sale prices monthly to the Ministry of Commerce, which will in turn report to NEPO. When a reported price at a station is deemed excessive, the Ministry may issue a warning to the oil company that owns the station[2]. If the company does not respond to the warning by lowering its price, then the government may ask the Petroleum Authority of Thailand (PTT) or Bangchak Petroleum (BCP), which are state enterprises, to intervene by intensifying competition through their own stations within the area. A NEPO report claimed that the policy is so successful that overpricing station is rarely found, at the ratio of less than 1 percent of the total stations surveyed[3].

[2] A price would be deemed excessive if it is much higher than the average Bangkok retail price plus transportation cost, or at least 20 satang per liter higher than the price of nearby PTT stations.

[3] NEPO, "Who benefits from the floated oil price?", July 1996 (In Thai)

Table 2.1 Comparison of Oil Price Setting before and after Liberalization

Oil Price	Pre-liberalization period	Post-liberalization period
Ex-refinery or import price	approved by the Petroleum subcommittee based on Singapore weekly price	determined by the domestic refineries based on Singapore spot price. Generally, changes once a week.
Excise and municipal tax	determined by the Ministry of Finance	determined by the Ministry of Finance
Oil fund contribution	approved by the Petroleum subcommittee. Generally changes once a week.	fixed at 3 satang per litre for most products.
Energy Conservation Fund contribution	not existed.	fixed. Applied since November 1, 1992
Marketing margin	fixed and approved by the Petroleum subcommittee	determined by each oil company

Market Entry Regulation

Oil market entry is also regulated at several levels. In the past, the government limited the number of refineries and importers. Setting up new service station was also subject to tight regulation.

The refinery industry was one that was tightly regulated concerning market entry as well as production capacity. In 1964, the industry was limited to only two oil companies, namely Esso and Summit (later became Bangchak). To cope with the increasing demand for oil products, in 1990 the government awarded four new licenses but continued to control the refinery's production capacity. One major problem concerning competition was that these refineries, licensed at different time, were not competing on a level-playing-field basis. For example, while Rayong Refinery Co. (RRC) and Star Petroleum Refining Co. (SPRC) were required to pay the royalty fee equivalent to 2 percent of sale proceeds plus 350 million baht front-end payment in return for a license and investment privileges, Bangchak and TPI paid no royalty fees and received no privileges.

In June 1997, the government took a big step to liberalize the refining industry, allowing any party to freely set up refineries or increase their production capacities without seeking a special permission. The company need only to submit an application to the Ministry of Industry for a factory license, as is required in other industries. Moreover, the business is no longer subject to pay a substantial front-end and annual royalty fee to

the government. This allows equal footing for competition among the refineries and importers[4].

Oil import was also liberalized to allow greater access into the market. The oil import control began in 1978. A company intending to import oil products had to be registered as an Article 6 oil trader according to the Petroleum Act. To be an Article 6 oil trader, the company had to meet certain conditions including a minimum trade volume, an oil storage facility and an oil reserve. Until the amendment of the Article 6 which eases the qualifying conditions, only 5 companies are such oil traders. Each company was allocated a designated portion of the import quota based on the trade volume of three previous quarters. Due to the limited number of oil companies that were qualified to import oil products and the falling real marketing margin as a result of the domestic retail price control, imports fell short of the assigned quota which led to a shortage of domestic supply. As a result, the import conditions were eased in 1988 to allow more oil traders as mentioned earlier.

The easing of regulation concerning the setting up of a service station helped promote competition in the retail market. Setting up a service station was strictly regulated for safety purposes. Service stations were allowed to be set up only on public roads with a minimum width of 12 meters and private roads with a minimum width of 10 meters. Entrance and exit of the station were also required to be at least 50 meters from a railway. Recently, the regulation was eased in a number of ways. For example, it is now possible to set up a service station alongside a small road with a width between 8 to 12 meters. Entrance and exit's minimum distance from a railway was also reduced to 30 meters.

2.2 Social Regulations

By social regulation, we refer to any regulation that aim at achieving social objectives, e.g., safety, security and environment protection. Needless to say these regulations also have great economic implications. Key social regulations in the oil market in Thailand include the environmental regulation and the stockpiling regulation.

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[4] Bangkok Post, "Stripping Away Barriers", 1997 Mid-year Economic Review, June 30, 1997 (p 40)

Oil Quality and Environmental Regulation

Since 1992 the government has gradually enforced an increasingly stringent regulation on oil quality to reduce air pollution problem. For gasoline, the regulation includes the reduction in the refinery temperature, the control of aromatics and benzene. For diesel, the regulation includes the reduction in oil viscosity, sulfur, and refinery temperature. Fuel oil is also required to produce less sulfur. The quality improvement of oil products came with higher refinery costs; 36 satang per liter higher for premium gasoline, 45 satang per liter for regular gasoline, 29 satang per liter for high-speed diesel and 18 satang per liter for fuel oil[5] The consumers are those who bear the burden of higher cost in return for less pollution.

Stockpiling Regulation

Due to security reasons, the government also intervenes in the oil market through the stockpiling policy which requires oil companies to reserve a minimum level of oil stock. The stockpile policy began in 1966 after the passing of the Petroleum Act. Until recently, Thailand had a stockholding requirement of 5 percent of sales (an equivalent of 18.25 days demand) for crude oil and also 5 percent of sales for most oil products. Thus, an oil company that was involved in both oil refinery and trade had to hold 10 percent of their sales volume (36.5 days demand) in reserves. The mandatory reserve requirement of 5 percent for crude oil and most oil products was eased to 3 percent in late 1997.

Now let us look at the policy of our neighboring countries. While Singapore and Malaysia has no official stock policy, Indonesia demands that oil companies reserve 9.3 percent of sales (an equivalent of 34 days demand) in stock. In practice, however, Indonesia oil companies reserve only about half of the official figure. Furthermore, their stocks do not consist of only the reserve tankage, but also oil in transit, stocks held in wholesale, and stocks in tankage at distribution centers. Korea's stockholding requirement is 7.4 percent of previous years' sales, an equivalent of 27 days demand, which may be kept as crude oil or oil products.

Direct comparison of these countries' policy cannot be easily made due to the fact that their policy environment is different. Factors that determine the percentage of oil reserve of a country includes the degree of dependency of the country on external oil supply, its industrial structure, risks from war or natural disaster, its geographical location, etc. Further, the fundamental logic of the system in each country under comparison may be completely different. For example, while Thailand has a separate

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[5] NEPO, "Who benefits from the floated oil price?", July 1996 (In Thai)

stockholding requirement for refiners and traders, in Indonesia they are considered to be the same entity and thus are subject to a single requirement only. A preliminary study by the Fesharaki Associates and Technical Advices compared the stockpiling costs of various countries at 1993 average prices with varying opportunity cost for capital. The study concluded that, at the time of comparison, Thai refiners bore the largest burden in terms of stockholding costs among neighbor countries[6]. Thus, the government decision to adjust our stockpiling requirement to lessen the burden of the oil companies seems to be an appropriate policy.

2.3 The Impact of Oil Market Liberalization: A Case Study of the US

While some social regulations have good rationale for their existence, many economic regulations, especially price and quantity regulations, have turned out to be counter productive. Before discussing the economic impacts of the 1991 deregulation in Thailand, we will review some experiences from a liberalization policy in a foreign country. The country selected is the US due to two reasons. First, its oil market is the most liberal in the world. Second, the information about the US liberalization policy is more readily available than that of most other countries.

By the beginning of the 1970's, the US imported nearly half the oil it consumed. During the 1973 Arab oil embargo, the US government imposed price controls on domestic oil to shield its consumers from oil price rises, and maintained the price of oil at well below world market levels until 1979. Towards the end of the 1970's, the price control mechanism came under fire for two main reasons. Firstly, there was no incentive to curtail petroleum consumption (important since oil was only in a finite supply). Secondly by relying on foreign imports of oil, US energy security was placed under the control of foreign powers who could reduce or increase the supply at will. Domestic prices of oil were controlled to the point where they were too low to encourage local oil companies to extract oil and sell oil at a profit. It was argued that price decontrols would raise domestic oil prices, reducing the domestic demand for oil and providing incentives for domestic oil firms to produce, removing the energy security problem. Under the Carter administration a system of phased price decontrol mechanisms went into effect so that by 1981, petroleum prices had been fully liberalized.

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[6] Fesharaki Associates Consulting and Technical Advices, "The Competitiveness of Thai Refining: A Survey Study", submitted to the Petroleum Institute of Thailand, January 1995

Prior to 1981, the US Federal government regulated not only the price of finished oil products such as gasoline, but also imports of oil to protect domestic oil companies and consumers from the effects of oil shocks as had been seen in 1973-74. Many of these rules aimed to restrict the freedom of the largest oil companies (hence preventing them from collecting "windfall profits" from the price rises caused by OPEC), and transfer some of the income gained from the oil companies to the consumers.

Supporters of continued government intervention in the domestic oil market, maintained that oil prices would "skyrocket, sending gasoline to $2/gallon[7]." They also contested that because of decontrol, inflation would soar, and oil companies would not reinvest their profits to search for new oil fields. They also argued that decontrol of oil prices would not reign in the demand for petroleum products, while raising the cost of living which would hurt the lower income groups in society.

In fact, the opposite happened. After the removal of price controls, the domestic petroleum industry set records in the number of new wells drilled, the number of drilling rigs increased, and investments in oil and gas operations reached all time highs. These events helped to stabilize and increase US domestic oil production, reversing a 10 year declining trend. Average refiner costs of imported crude fell from $38.50/barrel to $22.38/barrel, in real terms.

US consumers had been reducing their energy consumption through the latter part of the 1970's, and continued to do so during 1981-82, even after the oil price shocks had gone. Oil consumption went down from 18.8 million barrels/day in 1978, to just over 15 million barrels/day in 1982, and had declined a further 8% by 1985. This was partly due to rising demands for alternative energy sources, but also because consumers were becoming more energy conscious. The reduction in demand for oil reduced US import demands for oil (from 8.8 million barrels/day in 1977 to 4.9 million barrels/day in 1982), and this in turn brought down world prices for oil. Domestic prices for gasoline did not rise by as much as control advocates had predicted. There was a slight increase in the price of oil after decontrol, because of a move by OPEC to reduce their output of oil, which affected the world price. Now US domestic oil prices fluctuated with increases in demand and supply, and also with world prices of crude oil. To see this, witness the average monthly gasoline prices/gallon for 1981/83 (all grades of gasoline) both before and after decontrol:

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[7] Taken from "Two Energy Futures: A National Choice for the 80's", American Petroleum Institute, 1983.

January 1981: $1.27 (just before decontrol)

March 1981: $1.39 (two months after decontrol)

March 1982: $1.27 (one year later)

March 1983: $1.14 (two years later)[8]

When the above prices are adjusted for inflation, it is apparent that gasoline was selling for less than it had been in 1979. The downward trend in gasoline prices was also followed by downward trends in prices of home heating oil, jet fuel and heavy fuel oil[9].

The only cost to allowing oil prices to move with market forces was that now the US was subject to price fluctuations in the world price of crude oil. If oil import prices moved sharply up, because of a supply fluctuation as happened in 1991, then the effects would be felt by consumers. However, thanks to decontrol, the US was no longer largely dependent on a few OPEC nations for oil and could partly rely on domestic production to make up some of the supply. The flip side of the coin is that in the advent of a price collapse (such as that of 1986), a drop in oil prices would prove a boon to nations like the US when the costs of imports of crude were effectively halved. Of course a fall in world oil prices would translate into lower profits for domestic refiners and manufacturers. This is exactly what happened during 1986, as a major shake-up of the refining industry caused a large number of independent refineries to file for bankruptcy.[10] With bankruptcies and reductions in profits, firms would be forced to layoff workers, and new exploration of other drilling sites for oil would be put on hold.

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[8] ibid., p61.

[9] In 1981, the price of heating oil was $1.19/gallon, and it fell to $1.04/gallon, in 1985, or in real terms $0.88/gallon after being adjusted for inflation.

[10] See Kohl, (1991: 138) for more on the impact of the 1986 price decline on the oil industry.

Chapter 3
The Impact of Liberalization on Oil Price

As mentioned in Chapter 1, since the first oil price shock, oil pricing had become a very sensitive policy issue and the government had adopted measures to stabilize the domestic oil prices. Among many measures, the Oil Price Stabilization Fund, or Oil Fund, was central to the stabilization policy.

The objective of the Oil Fund, as defined by the Oil Fund Act, is to stabilize domestic retail oil prices in the face of short-run fluctuations in world oil prices. Thus when world oil prices are rising, the government may use the oil fund to subsidize oil prices and keep retail prices constant. On the other hand, when world oil prices are falling, the oil companies are required to pay a levy to build up the oil fund reserve.

This chapter will discuss the impact of the 1991 price deregulation on the prices of oil product. Particularly, we are interested in two issues that are of public concern:

1) What is the impact of the liberalization on oil price stability? Have oil product prices become less stable after the liberalization?

2) What is the impact of the liberalization on the speed of price transmission? Are the increase in oil prices passed on more quickly than the decreases as some people tend to believe?

3.1 The Impact on Price Stability

To study the impact of the liberalization on price stability, we compare the movements of Bangkok retail price of two oil products, i.e., high-speed diesel and gasoline before and after liberalization (Figure 3.1 and 3.2). The Singapore prices, which are the world prices for Thailand, are plotted for a reference.

From the figures, it seems that the Bangkok retail prices of both oil products are more stable before than after liberalization. Careful quantitative analysis, however, shows that the situations are rather complex. To measure the degree of price instability, we adopt the *coefficient of variance*, defined as the standard deviation of the price during a given period divided by its mean. Thus, the higher the coefficient, the less stable the price is.

Table 3.1 compares the coefficients of Singapore spot price and Bangkok retail price during the period before and after liberalization. The pre-liberalization period is analyzed both for the whole period (January 1988 - May 1991) and the period with apparently stable price (January 1988 - January 1990).

The table shows that the Bangkok prices of both products are more stable during the period after liberalization. The coefficients of variance of Bangkok retail price for premium gasoline and high-speed diesel during the whole period before liberalization are 0.13 and 0.15, respectively while they are 0.05 and 0.06, respectively after liberalization. However, this is partially due to difference of the stability of the world price during the two periods; the world prices of both products happened to be more stable during the years after liberalization than during the turbulent years before liberalization.

To make a more appropriate comparison, we introduce a new measure, the *instability index*. The index is defined as the ratio of the coefficient of variance of the Bangkok price and that of the Singapore price during the same period. Again, the higher the index, the less stable the price is. Table 3.2 compares the indices of the pre-and post-liberalization periods.

Table 3.1 Coefficients of Variance of Oil Prices before and after Liberalization

Period	Premium Gasoline		High Speed Diesel	
	Bangkok Price	Singapore Price	Bangkok Price	Singapore Price
Before Liberalization - stable period (Jan 88 - Jan 90)	0.13	0.02	0.15	0.01
Before Liberalization - whole period (Jan 88 - May 91)	0.13	0.25	0.16	0.31
After Liberalization (Sept 92 - Oct 96)	0.05	0.12	0.06	0.11

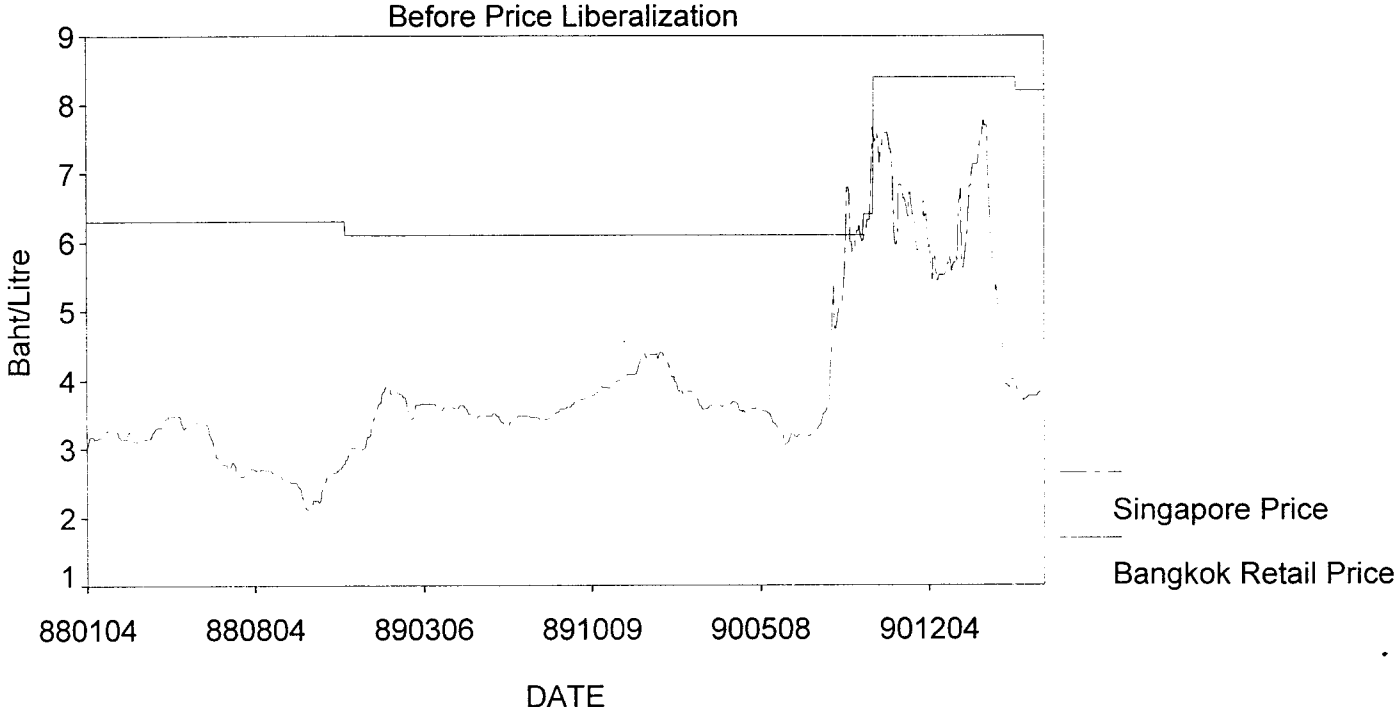
Table 3.2 Instability Index of Oil Prices before Liberalization

Period	Premium Gasoline	High Speed Diesel
Before Liberalization - stable period (Jan 88 - Jan 90)	0.154	0.067
Before Liberalization - whole period (Jan 88 - May 91)	0.520	0.516
After Liberalization (Sept 92 - Oct 96)	0.416	0.509

Figure 3.1a

Price Movement of High Speed Diesel

Before Price Liberalization



Price Figure 3.1b

Movement of High Speed Diesel

After Price Liberalization

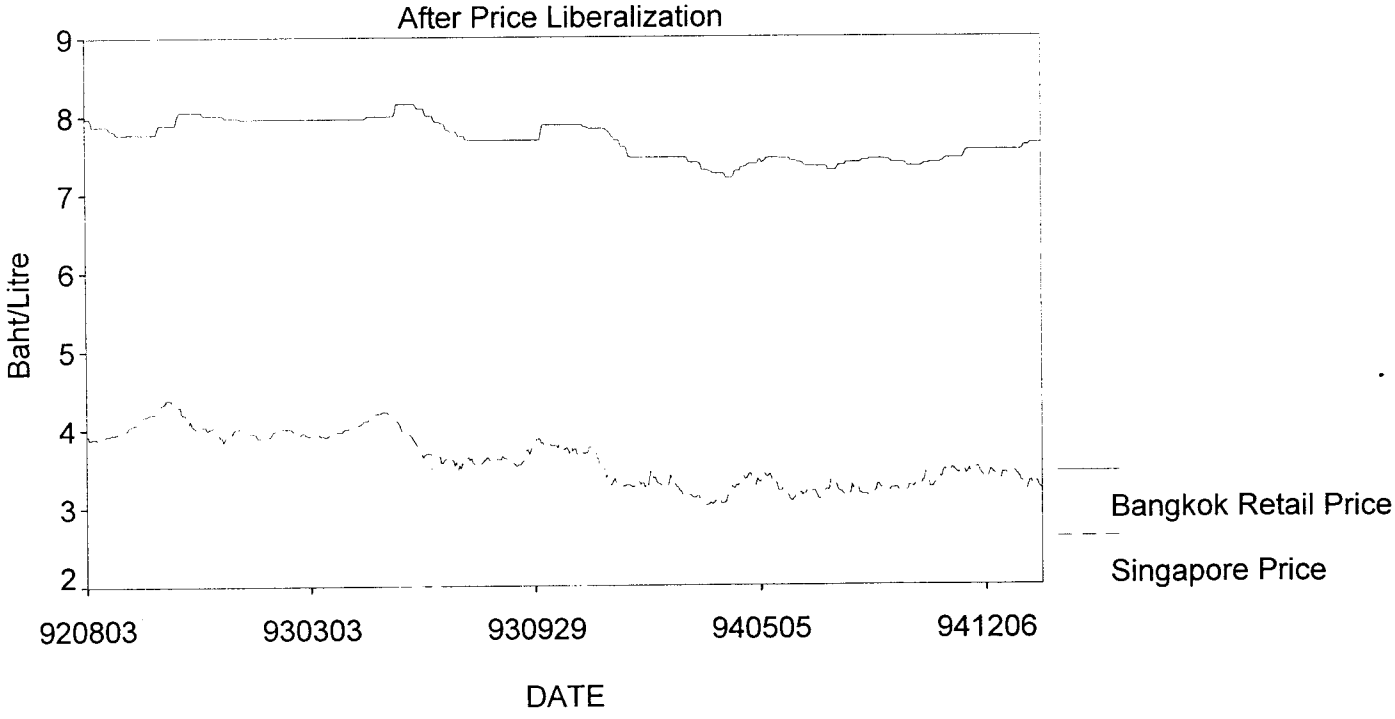


Figure 3.2a

Price Movement of Gasoline

Before Price Liberalization

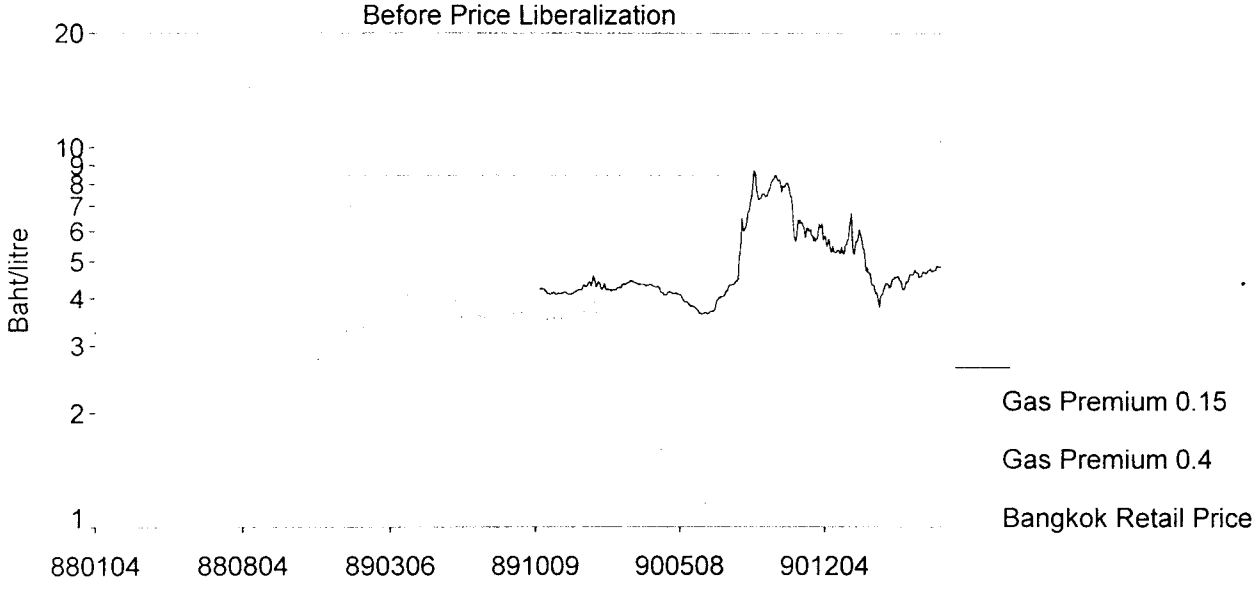
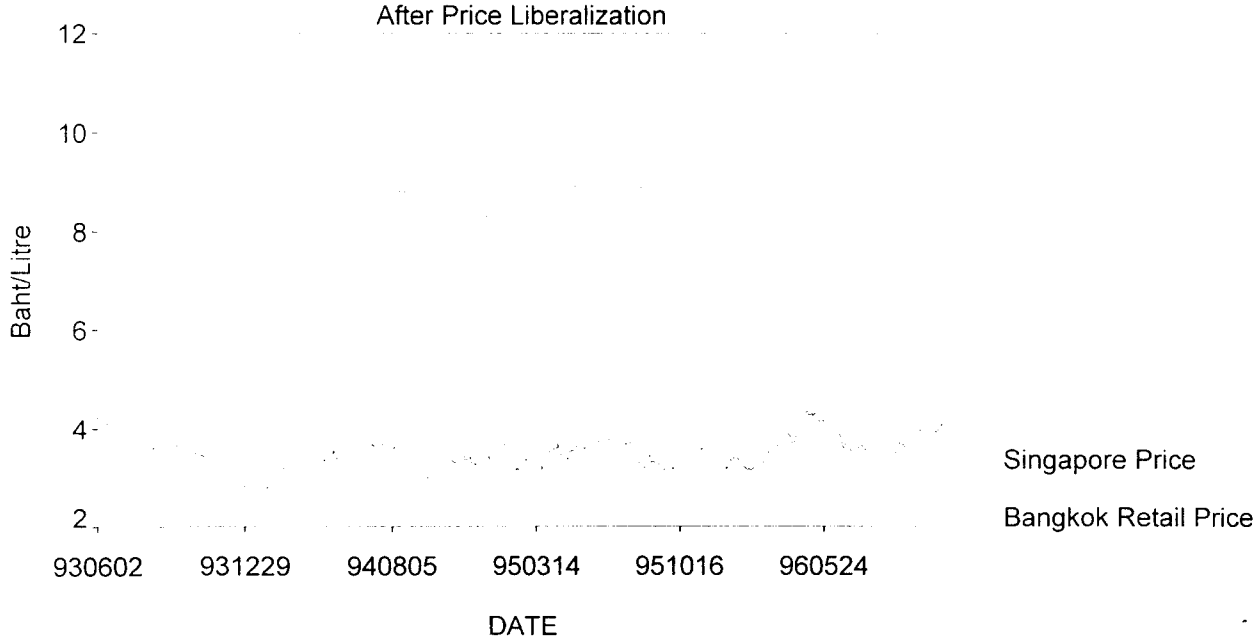


Figure 3.2b

Price Movement of Gasoline

After Price Liberalization



It can be seen from the table that price stabilization policy had been quite effective when there were small fluctuations in the world price as evidenced by a relatively stable prices during January 1988 and January 1990. The instability indices for gasoline and diesel prices are 0.154 and 0.067, respectively before liberalization while they become 0.416 and 0.509, respectively after liberalization.

However, the policy became ineffective when the world price changes drastically as evidenced during the first half of 1991. This can be seen from sharp rises of domestic oil prices during that period. Taking an average over the whole period before liberalization, oil prices are less stable than those of the post-liberalization period. The instability indices for gasoline and diesel prices are 0.520 and 0.516, respectively for the whole period before liberalization while they are only 0.416 and 0.509, respectively after liberalization.

From the analysis, we can conclude that the policy was effective only for a short period and has defeated its purpose of stabilizing the oil prices in the long run.

3.2 Speed of Price Transmission

As mentioned before, there is a myth among consumers that oil companies often take advantage of the oil market liberalization. Particularly, it is believed that the companies respond to the upward trend of the world price in a manner different from the response to the downward trend; the increases in price are passed on more quickly than the decreases. Whether the claim is correct is still neither proven nor refuted.

Model of Price Transmission

Before analyzing the problem, let us start with the mechanism in which the price change in the world market is transmitted to Thailand retail price. From the interview with major oil companies, we learned that, unless being controlled, the Bangkok retail price is adjusted to the Singapore price, which is the world market price for Thailand. The adjustment process, however, does not occur immediately. Thus the Bangkok retail price on a given day depends on the Singapore prices during a period before that day with the Singapore price on the same day having greatest influence and the price on a day further back in the past having less influence. A model known to be suitable to this adjustment process is the *geometric lag model*[1]. Thus we adopt a geometric lag model in which

[1] Robert S. Pindyck and Daniel L. Rubinfeld, "Econometric Models and Economic Forecast", McGraw-Hill, 1991

lagged values of the Bangkok retail price and the Singapore price on the same day are included as explanatory variables. The model can be written as:

$$P^B_t = \alpha + \beta P^S_t + \gamma P^B_{t-1}$$

where α, β and γ are the coefficients of the equation, P^B_t is the Bangkok retail price on day t, and P^S_t is the Singapore spot price on the same day. From the model, note that the greater γ becomes, the more dependent today domestic price is on yesterday's price and the less dependent on the world price. This means that γ can be interpreted as the level of sluggishness of the price transmission.

To make the Bangkok and Singapore prices comparable, we have to abolish the effect of taxes, Oil Fund and Energy Conservation Fund contributions which are varied during the period under study. The modified Singapore price, defined below, is thus used instead of the Singapore spot price.

The modified Singapore price =
Singapore spot price +
transportation and insurance costs +
import tariff +
excise and municipal tax +
Oil Fund/Energy Conservation Fund contribution +
VAT.

While the data concerning the rates of tariff, taxes, Oil Fund and Energy Conservation Fund contribution are available, the transportation and insurance costs are unknown to us and thus assumed to be constant. The assumption allows us to ignore the term in the analysis without effecting the interpretation of the result.

The estimation is based on daily data of Bangkok retail price collected by the National Energy Policy Office (NEPO) from the year 1988 to 1996. For comparison, the data are divided into two periods: the pre-and post-liberalization period. Details of the data are described in Table 3.3. The parameters are estimated by using the ordinary least square (OLS) regression analysis when possible[2]. Otherwise, the Maximum-Likelihood estimation is used.

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[2] When there are no sign of serial correlation. That is when the absolute value of the h-Durbin test is greater than 2.

Table 3.4 and Table 3.5 show the result of the estimation for the pre-and post-liberalization periods, respectively. From Table 3.4, we note that, before the liberalization, Bangkok retail prices did not seem to respond to the changes in world prices, for all the products studied[3]. This is not surprising since the domestic retail prices were controlled by the government. After the liberalization, however, the domestic retail prices of all the products became sensitive to the world price[4]. Since the result from the estimation is consistent with the expectation, it would appear that the model has captured the essence of the price transmission mechanism.

Table 3.3 Data Used in the Price Transmission Analysis

Product	Product Name		Period
	Thailand	Singapore	
Before Liberalization			
High Speed Diesel	HSD	go 1.0%	Jan 1988-May 1991
Premium Gas Oil	GP	0.4 gl	Oct 1989-Dec 1990
Regular Gas Oil	N.A.	N.A.	N.A.
Fuel Oil	FO1500	FO180	Jan 1988-Apr 1991
After Liberalization			
High Speed Diesel	HSD	GO 0.5	Aug 1992-Nov 1996
Premium Gas Oil	GP	0.15 gl	Jan 1992-Jan 1995
Regular Gas Oil	ULG	UNL 92	Jun 1993-Nov 1996
Fuel Oil	FO1500	FO180	Jul 1993-Nov 1996

Data Source: the National Energy Policy Office (NEPO)

Table 3.4 The Price Transmission Equations of Oil Products (before liberalization)

Product	α	β	γ	**Statistics**
High-speed Diesel	-0.00368	0.01186	0.98995*	Adj R^2 = 0.9937
Premium Gasoline	-0.04425	0.01865	0.98858*	Adj R^2 = 0.9904
Regular Gasoline	N.A.	N.A.	N.A.	N.A.
Fuel Oil	0.012838	0.0064223	0.99045*	Adj R^2 = 0.9927

Notes : 1) The equations are of the form $P_t^B = \alpha + \beta P_t^S + \gamma P^B_{t-1}$
2) The parameters are estimated by a Maximum Likelihood Estimator
3) * is shown when the parameter is significant (at 10% level of significance).
4) Adjusted R^2 measures how well the model explains the data. Adjusted R^2 = 1 refers to a perfect explanation.

[3] None of the value of β in the equations are significant.
[4] The value of β in every equation is significant.

Table 3.5 The Price Transmission Equations of Oil Products (after liberalization)

Product	α	β	γ	Other statistics
High-speed Diesel	0.85767	0.20807*	0.98162*	h test = 7.1067 Adj R^2 = 0.9976
Premium Gasoline	0.03492*	0.024116*	0.97507*	h test = 6.033 Adj R^2 = 0.9977
Regular Gasoline	0.0813	0.06177*	0.94534*	h test = -8.7939 Adj R^2 = .96544
Fuel Oil	0.01085	0.03776*	0.96623*	h test = 0.000 Adj R^2 = 0.9979

Notes : 1) The equations are of the form $P_t^B = \alpha + \beta P_t^S + \gamma P^B_{t-1}$

2) The parameters are estimated by an Ordinary Least Square Estimator

3) * is shown when the parameter is significant (at 10% level of significance).

4) Adjusted R^2 measures how well the model explains the data. Adjusted R^2 = 1 refers to a perfect explanation.

Based on the above basic model, we will now develop a more advanced model to test our hypothesis whether the domestic oil prices respond to changes in the world price more quickly during the upward trends than during downward trends. To distinguish the speed of transmission during the upward and the downward trends, we add a dummy variable D to the basic model, with $D = 1$ referring to the upward trends and $D=0$ to the downward trends. The new model becomes:

$$P_t^B = \alpha + \beta P_t^S + \gamma P^B_{t-1} + \beta' D P_t^S + \gamma' D P^B_{t-1}$$

Note that when $D=0$ the model is reduced to:

$$P_t^B = \alpha + \beta P_t^S + \gamma P^B_{t-1}$$

while when $D=1$ the model is reduced to:

$$P_t^B = \alpha + (\beta+\beta') P_t^S + (\gamma+\gamma') P^B_{t-1}$$

Thus the coefficient γ' represents the difference between the level of the upward sluggishness and the downward sluggishness. The hypothesis we would like to test is thus:

$\gamma' = 0$: the domestic price responses symmetrically to both the upward and downward trends

$\gamma' > 0$: the domestic price responses more slowly to the upward trends

$\gamma' < 0$: the domestic price responses more quickly to the upward trends

Table 3.6 shows the result of testing the hypothesis for the period after liberalization. The result shows that, contrary to the popular belief, there is *no* evidence that the speed of price transmission had been faster during the upward trends than during the downward trends[5]. In fact, the speed were virtually the same for regular gasoline and fuel oil. In case of high speed diesel and premium gasoline, the speed was even *slower* during the upward trends than during the downward trends. The level of the difference, γ', however, is close to zero, reflecting that the speed was only slightly slower.

From the above discussion, we can conclude that there was no evidence to support the claim about the opportunistic behavior of the oil companies. Even if the companies would like to take advantage of the liberalization, it is impossible for them to do so in a competitive market, which is a result of the liberalization.

For comparison, we also analyze the speed of price transmission of high speed diesel for a more recent period, between November 1996 and May 1997. The result shown in Table 3.7 also confirms the above conclusion that there was no difference in the speed of transmission during the upward and downward trends[6]. Interestingly, however, it seems that the speed of price transmission for both the upward and the downward trends has become faster now than during 1992-1996[7]. This may suggest that the market has become even more competitive and more responsive to the world price.

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[5] The value of γ' in every equation is either greater than zero or insignificant.

[6] The value of γ' is insignificant. This result is also confirmed in another analysis conducted for the period after the economic crisis and the floatation of Baht.

[7] The value of γ during the period is significant and is less than that of the period between 1992-1996.

Table 3.6 Price Transmission Equation of Oil Products after liberalization (1992-1996)

Oil Product	α	β	γ	β'	γ'	Other statistics
High-speed Diesel	0.0177	0.0202*	0.9808*	-0.0004*	0.0022*	h test = 2.895 adj R^2 = .9978
Premium Gasoline	0.39	0.023*	0.975*	-0.001*	0.002*	h test = -3.42 adj R^2 = .9978
Regular Gasoline	0.076	0.640*	0.945*	-0.002*	0.0005	h test = -9.118 adj R^2 = .9655
Fuel Oil	0.01085	0.038*	0.966*	-0.00003	-0.0001	h test = 0.0723 adj R^2 = .9979

Notes : 1) The equations are of the form $P_t^B = \alpha + \beta P_t^S + \gamma P^B_{t-1} + \beta' D P_t^S + \gamma' D P^B_{t-1}$

2) The parameters are estimated by an Ordinary Least Square Estimator

3) * is shown when the parameter is significant (at 10% level of significance).

4) Adjusted R^2 measures how well the model explains the data. Adjusted R^2 = 1 refers to a perfect explanation.

Table 3.7 The Price Transmission Equation of High Speed Diesel (Nov 1996- May 1997)

Oil Product	α	β	γ	β'	γ'	Other statistics
High-speed Diesel	0.243*	0.070*	0.916*	-0.0018*	0.0008	h test = -2.692 adj R^2 = 0.989

Notes : 1) The equations are of the form $P_t^B = \alpha + \beta P_t^S + \gamma P^B_{t-1} + \beta' D P_t^S + \gamma' D P^B_{t-1}$

2) The parameters are estimated by an Ordinary Least Square Estimator

3) * is shown when the parameter is significant (at 10% level of significance).

4) Adjusted R^2 measures how well the model explains the data. Adjusted R^2 = 1 refers to a perfect explanation.

Chapter 4

The Impact of Liberalization on Oil Consumption Pattern

In this chapter, we will analyze the impact of the 1991 oil price liberalization on the consumption pattern of oil products. Particularly, we will focus on the following questions:

1. Which economic sectors were most affected by the floating of oil product prices?

2. To what extent had the liberalization improved the allocation efficiency of the oil market?

3. What is the impact of setting a single price for each oil product throughout the country?

As a background for the analysis, we review some key concepts including the concept of price elasticity of demand, consumer and producer surplus, the cost of price distortion, and cross subsidization.

4.1 Some Background Concepts

Price and Cross Elasticity of Demand

The *price elasticity of demand*, or simply the price elasticity, measures how much the quantity demanded for a product changes when its price changes. More precisely, the price elasticity of demand for product A, represented as ε_A, is calculated as the ratio of the percentage change in quantity demanded for A and the percentage change in its price:

$$\varepsilon_A = (\Delta Q/Q)/(\Delta P/P)$$

where Q is the quantity demanded, P is the price, ΔQ and ΔP are the change in quantity demanded and the change in price, respectively. For example, if the price elasticity of premium gasoline is -1.1, the quantity demanded for premium gasoline will decrease by 1.1 percent when its price increases by 1 percent. Notice that the sign of price elasticity of a product is negative since the quantity demanded for a product usually falls when its price rises, and vice versa, the quantity demanded for a product usually rises when its price falls.

A concept related to price elasticity of demand is the *cross elasticity of demand.* Cross elasticity of demand, or simply cross elasticity, is a measure of the influence of a change in one product's price on the demand for another product. More precisely, the cross elasticity of product A for change in price of product B, represented as ε_{AB}, is calculated as the ratio of the percentage change in quantity demanded for product A and the percentage change in price of product B, assuming other variables are held constant:

$$\varepsilon_{AB} = (\Delta Q_A / Q_A)/(\Delta P_B / P_B)$$

where Q_A is the quantity demanded for product A and P_B is the price of the product B, ΔQ_A and ΔP_B are the change in quantity demanded for product A and the change in price of product B, respectively. For example, if the cross price elasticity of premium gasoline for the change in price of high-speed diesel is 0.6, the quantity demanded for premium gasoline will increase 0.6 percent when the price of diesel increases by 1 percent. Notice that the sign of cross price elasticity of demand for two products that are substitutes is positive since the quantity demanded for one product will increase when the price of the other product increases.

Consumer and Producer Surplus

Figure 4.1A shows a demand curve and a supply curve for a product, say premium gasoline. As explained above, as the price of a product falls, the quantity demanded increases; the demand curve therefore slopes downwards from left to right. The supply curve, on the other hand, usually slopes upward. This is because as the price of a product rises, more producers will be willing to supply at the higher price. With buyers and sellers free to trade, a balance of supply and demand will be established at the point where the two curves cross (point X), where the price is P and where the same quantity, Q, is both demanded and supplied. That point of equilibrium gives the market's answer to how much of the product will be traded and at what price.

The shaded area between the demand and supply curves, to the left of the point where they cross, has a special significance; it represents the net addition to social welfare that is created when the product is bought and sold at the market price.

If we divide the area into two, the upper part, A, represents the so-called *consumer surplus.* Every unit of the product sold when supply equals demand--the whole of the quantity Q in the figure--is sold at price P. But smaller quantities of the product could have been sold at prices higher than P. Only for the last (or marginal) unit sold is the consumer's willingness to pay is as low as P. That is, all but the very last unit produced have been sold for less than they are worth to the consumer. The area A

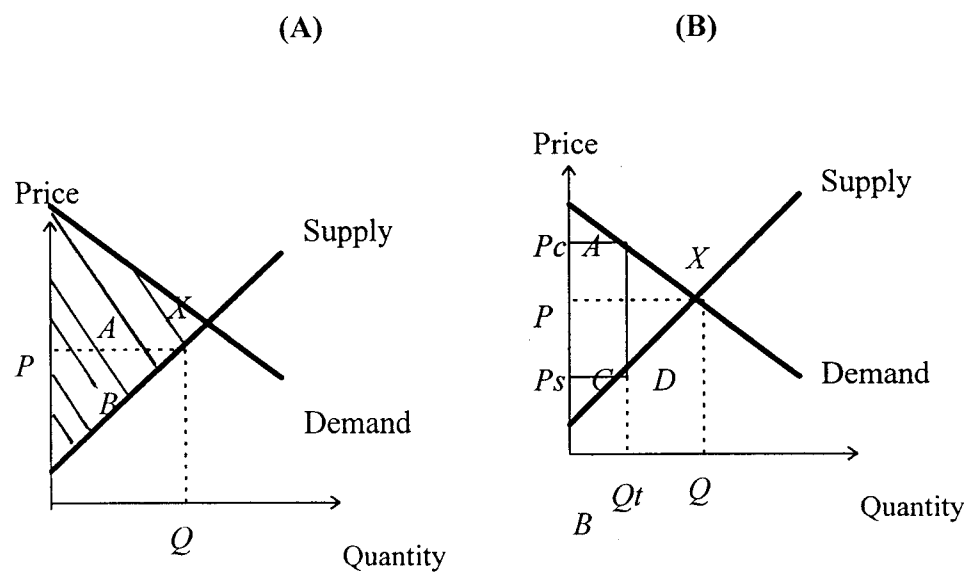
adds up these individual surpluses, unit by unit, thus showing the total net gains accrued to consumers.

By the same logic, the lower part of the area between the demand and supply curves in the Figure 4.1A, *B*, represents the *producer surplus*. Only the last unit supplied is the price the producer willing to supply as high as P. Other producers would have been willing to supply at a lower price, enough to deliver some smaller quantity of products to the market. When these not-on-the-margin units are sold at the market price, their producers are paid more than they would have been willing to accept. The area *B* thus adds up all the producer surpluses.

The Cost of Price Distortion

Figure 4.1B shows what happens when a tax is imposed, raising the price paid by consumers from *P* to P_C, and lowering the price received by suppliers to P_s. At these new price, Q_t is demanded and supplied. The amount of the tax (the difference between P_C and P_s) multiplied by the number of units sold (Q_t) gives the revenue raised for the government (area *C* in the figure). Both the consumer surplus, *A*, and the producer surplus, *B*, are accordingly smaller than before.

Figure 4.1 The Cost of Price Distortion



That was to be expected. The point is, though, that the two surpluses, added together, have shrunk by more than the amount taken away in tax. Now that the quantity of products supplied has fallen to Q_t, the triangle D has disappeared: it is no lomger a part of the government's tax revenue, and it is no longer part of the economic surplus; it has simply vanished. This part of the reduction in the surplus is a pure loss to the economy, known in the jargon as the *deadweight loss* of the tax. The implication is that if the government raised the area C in taxes and then transfer the tax revenue directly back to the consumers as a lump-sum paymeny, the economy would still be worse off than before because the area D would still be missing.

If the demand and supply curves were indeed curves rather than straight lines, the relationship between tax rise and net economic loss would not be quite so simple. But the same argument would still hold. In general, the size of the deadweight loss increases more than proportionate to the size of the tax increase. An analogous argument can be made for a subsidy, which can be interpreted as a negative tax. Consequently, price distortion either through tax or subsidy creates losses to the economy.

Cross Subsidization

One of the many perplexing aspects of economic regulation is the common use of cross-subsidization. Cross-subsidization is the use of revenue from the sale of one product to subsidize the sale of another product. More specifically, the price of one product is set above its average cost while the price of the second product is set below its average cost. An Oil Fund is an example of an implementation of a cross-subsidy policy, resulting in a higher price for gasoline and lower prices for diesel, fuel oil and LPG.

To measure the effect of a cross-subsidization policy, consider a regulated industry that offers two products, say, products 1 and 2. Suppose that the regulatory agency decides to raise the consumption of the higher-cost product, which is assumed to be product 2. The regulated price for product 2 is then set at P_2 which is below C_2, the unit cost of producing product 2 inclusive of what considers to be a normal profit, generating Q_2 unit of consumption.

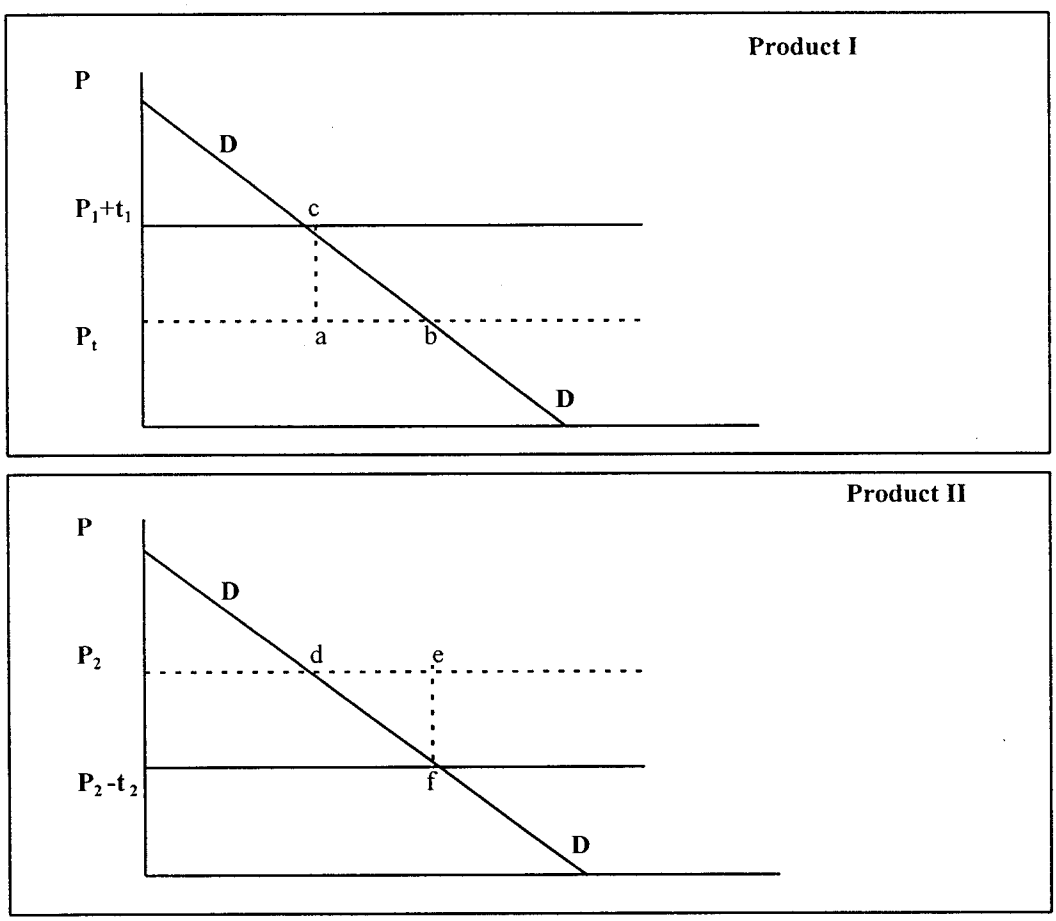
Note that the industry is incurring losses equal to $(C_2 - P_2) \times Q_2$. If the firm is to earn at least a normal profit, which is necessary in order to raise new capital and avoid bankruptcy, the regulatory agency must increase the price of product 1 from the normal level of C_1, the unit cost of producing product 1 plus some profit, to P_1. Here P_1 is set to allow a regulated firm to cover the losses from producing product 2 according to the following formula:

$$(C_1 - P_1) \times Q_1 + (C_2 - P_2) \times Q_2 = 0.$$

If product 1 and 2 are independent, i.e., they are neither competing nor substitute products, the deadweight loss of a policy designed to subsidize the supply of product 2 is then the sum of triangle *abc* and *def* in Figure 4.2.

For more general case where there are more than two products, the estimation of deadweight losses due to cross-subsidization is more complicated but can be calculated in a similar manner. Appendix A describes the technical details of the estimation in our analysis of the Oil Fund.

Figure 4.2 Deadweight Loss from Cross Subsidization



4.2 The Impact on Some Economic Sectors

Oil products are important inputs into the economic system. Thus, changes in the their prices will undoubtedly have a significant impact on the performance of the economy. In this section, we will analyze the impact of the 1991 oil price liberalization on some key economic sectors. The objective of the analysis is to identify the sectors that were most affected by the liberalization and the extent to which they are affected.

Intuitively, sectors that are large consumers of oil products would be more affected by the floating of oil prices than those that are small consumers. Sectors consuming mostly gasoline which has become relatively cheaper upon liberalization will be positively affected while those consuming mostly diesel, fuel oil or LPG which have become relatively more expensive will be negatively affected. To determine a more precise sectoral impact, however, we have to refer to the Input-Output table constructed by the National Economic and Social Development Board (NESDB).

From the Input-Output table, we have identified top 20 sectors that are most heavy users of oil products. These range from land, sea and air transportation to fishery, mining, electricity generation, and some manufacturing sectors such as cement and glass manufacturing. Table 4.1 shows the percentage share of the cost of oil to the total cost of each of these sectors in 1990. The percentage share of the cost of oil for land transportation, for example, is about one third of the total cost. Not shown in the Tables are sectors whose costs of oil products represent a small proportion of their total cost. These sectors are marginally affected by the liberalization.

It should be noted that the ratio of oil consumption cost to the total cost is just a rough indicator to determine the extent that a sector will be affected by changes in oil price since it reflects only the *direct effect*. However, in some cases the *indirect effect* can be very important. For example, while the direct effect of changes in oil price to the cement manufacturing sector is associated with the change in the cost of oil as an input in the production process, there are indirect effects due to changes in transportation and other utility's costs that themselves are also consumers of oil products. Table 4.2 shows the total (direct and indirect) effect on the 20 sectors that are most sensitive to oil price.

The numbers in the Table reflect the adjusted percentage share of the cost of oil to the total cost of each of these sectors. Among the sectors most affected are again transportation, fishery, mining, and electricity generation.

It does not follow, however, that the sectors which consume oil products most heavily will necessary be negatively affected by the liberalization. This is because most sectors consume both gasoline which has become relatively cheaper and diesel and fuel oil which have become relatively more expensive after the liberalization. To decide whether the net effect of the liberalization on each of the concerned sector is positive or negative, and to estimate the extent of the effect, we need to look into the structure of the oil consumption of each of these sectors. Table 4.3 shows the consumption structure of some major oil consuming sectors.

From the table, it can be seen that even sectors that heavily consume oil products, such as the transportation sectors, are less negatively affected by the liberalization than it first appeared to be, referring only to Table 4.2. For example, if the price of diesel rose by 1%, the cost of sea transportation would rise by less than 0.306%. This is because of two reasons. First, the sector also consumes gasoline, which has become relatively cheaper by the liberalization. Second, when price rises, consumption falls, dampening the impact of price rise. Thus, figures in Table 4.2 should to taken as the maximum values.

Although Table 4.3 and the above discussion might give the impression that most sectors are negatively affected by the liberalization since they consume more diesel than gasoline, it should be noted that there are gains accrued to certain individuals such as passenger car owners, who benefit from relatively cheaper gasoline. Due to the way the data are gathered, however, we are unable to estimate the collective gains of these individuals.

Intuitively, the termination of the Oil Fund should have a zero net impact on total cost of the whole society if gains accrued to sectors that are positively affected and losses incurred by those negatively affected are properly accounted for. However, in the next section, we will show that there are net benefits from relatively liberalization associated with the elimination of inherent inefficiencies caused by price distortions.

Table 4.1 Top Twenty Oil Consuming Sectors

Rank	Sector	Percentage Share of Oil Expenditure to Total Cost (%)
1	Ocean and Coastal Water Transport	29.28
2	Road Freight Transport	25.46
3	Road Passenger Transport	24.21
4	Inland Water Transport	21.79
5	Ocean and Coastal Fishing	17.00
6	Railways	15.52
7	Agricultural Service	13.59
8	Tin Ore	13.30
9	Electricity Generation and Distribution	10.33
10	Air Transport	10.31
11	Textile Bleaching and Finishing	9.43
12	Petroleum and Natural Gas	7.80
13	Sanitary and Similar Services	7.34
14	Chemical Fertilizer Minerals	6.99
15	Coal and Lignite	6.88
16	Glass and Glass Products	6.69
17	Cement	6.62
18	Tungsten Ore	6.56
19	Structural Clay Products	5.92
20	Fluorite	5.65

Note: Agricultural service refers to service in the agricultural sector, e.g., irrigation and co-operative activities.

Source: NESDB's I-O Table (1990)

Table 4.2 Top Twenty Sectors Sensitive to Oil Price

Rank	Sector	Percentage Change in Cost for 1 Percent Change in Oil Price
1	Ocean and Coastal Water Transportation	0.306
2	Road Freight Transport	0.270
3	Road Passenger Transport	0.256
4	Inland Water Transport	0.225
5	Railways	0.183
6	Ocean and Coastal Fishing	0.181
7	Tin Ore	0.150
8	Agricultural Services	0.144
9	Air Transport	0.143
10	Electricity Generation and Distribution	0.140
11	Aircraft	0.124
12	Textile Bleaching and Finishing	0.122
13	Iron and Steel	0.114
14	Other Petroleum Products	0.112
15	Fluorite	0.102
16	Coal and Lignite	0.097
17	Glass and Glass Products	0.096
18	Cement	0.096
19	Structural Clay Products	0.092
20	Construction of Telephone	0.092

Note: Agricultural service refers to services in the agricultural sector, e.g., irrigation and co-operative activities.

Source: Calculated from NESDB's I-O Table (1990)

Table 4.3 Oil Consumption Structure of Some Major Sectors

Unit: Percentage

Sector	LPG	Premium Gasoline	Regular Gasoline	HSD	Fuel Oil	Kerosene	LSD	Jet Oil
Transportation and Communication	2.29	17.39	17.17	52.10	1.58	0.00	0.63	8.84
Electricity Gas and Water	0	0	0	12.78	87.22	0	0	0
Manufacturing	17.54	0.84	1.06	15.26	60.35	3.34	1.61	0
Basic Metal Industry	21.70	0.17	0.19	13.01	49.91	3.06	11.97	0
Mining and Quarrying	0.08	1.27	1.07	80.92	15.23	0.85	0.57	0
Agriculture, Forestry, and Fishing	0.33	0.19	3.90	95.39	0.14	0.05	0.00	0

Source: National Energy Administration, Ministry of Science Technology and Energy

4.3 The Impact on Consumption Efficiency

In section 4.1, we have argued that the Oil Fund, implemented as a cross-subsidization scheme, creates deadweight losses to the economy. Liberalizing the oil market thus resulted in net gains to both producers and consumers. Due to the lack of information on the producer side, we will focus only on estimating the impact of the liberalization on consumer surplus.

With some assumption stated in Appendix A, the size of the deadweight loss for each oil product incurred between 1980 and 1990 can be estimated geometrically by the area traced out by the price set by the Oil Fund, the free-market price and the demand curve as illustrated in Figure A1 in Appendix A. The free market price represents the hypothetical price that would have prevailed had the market been liberalized. While the price set by the Oil Fund can be observed directly, the free-market price has to be estimated from the following equation:

The free market price =

the observed price

- taxes before liberalization

+ taxes after liberalization

- marketing margin before liberalization

+ marketing margin after liberalization

- the Oil Fund contribution before liberalization

+ the Oil Fund contribution after liberalization

The demand curve of each product is constructed from its price and cross elasticity. The value of the price and cross elasticity for each product shown in Table 4.4, is presented as a range of numbers estimated by other researchers and are grouped into low and high cases.

The size of the deadweight losses estimated for four major products, i.e., premium gasoline, high-speed diesel, LPG and fuel oil are shown in Table 4.5 and Table 4.6 for both the low and high cases, respectively.

In the low case, the estimated total deadweight loss ranges from 283 million baht in 1980 to 1,371 million baht in 1985. This amounts to 0.35 to 1.92 percent of the total vale of consumption. In the high case, the total deadweight losse ranges from 389 million baht in 1980 to 2,951 million baht in 1985. This amounts to 0.7 to 4.1 percent of the consumption value.

The estimation shows that the deadweight losses incurred by the cross-subsidization policy were quite significant in particular during 1981 and 1985 as there was a huge gap between the price of premium gasoline and that of high speed diesel. Such a large price distortion led to an under-consumption in the premium gasoline market and an over-consumption in the diesel market.

Table 4.4 Price and Cross Elasticity of Demand of Oil Products used in the Estimation

	Gasoline			Diesel	LPG	Fuel Oil
	Price	Cross Price Elasticity		Price	Price	Price
	Elasticity	Diesel	LPG	Elasticity	Elasticity	Elasticity
Case I (high case)	-1.1	0.589	0.29	-0.8	-1.4	-0.42
Case II (low case)	-0.304	0.24	0.17	-0.3	-0.357	-0.4

Source: From various sources

Table 4.5 Deadweight Losses during 1980-1990 incurred by the Oil Fund (High Case)

Unit: million baht

Year	Premium Gasoline	Diesel	LPG	Fuel Oil	Total Loss	Percentage of Consumption Value
1980	76.6	10.7	98.3	202.0	388.8	0.70
1981	696.3	740.6	31.7	296.2	1,773.1	2.63
1982	1,318.6	870.1	215.2	129.9	2,553.4	4.15
1983	1,235.0	619.1	258.8	147.4	2,278.5	3.55
1984	720.1	799.9	146.7	212.5	1,890.2	2.73
1985	578.6	1852.7	161.6	346.4	2,951.2	4.12
1986	336.7	252.2	55.4	31.2	680.9	1.09
1987	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1988	404.5	281.7	6.5	23.5	720.7	0.96
1989	86.8	608.8	1.6	146.6	845.6	0.95
1990	78.2	957.1	50.9	210.7	1,299.0	1.12

Source : Estimated by TDRI

Table 4.6 Deadweight Losses during 1980-1990 incurred by the Oil Fund (Low Case)

Unit: million baht

Year	Premium Gasoline	Diesel	LPG	Fuel oil	Total Loss	Percentage of Consumption Value
1980	37.8	4.0	28.6	211.5	282.5	0.51
1981	237.5	294.5	8.6	310.2	853.7	1.26
1982	416.8	347.1	62.9	136.1	969.3	1.57
1983	388.3	244.6	75.4	154.4	868.6	1.35
1984	241.8	317.0	41.2	222.6	826.3	1.20
1985	207.0	751.9	45.4	362.4	1,371.0	1.92
1986	113.0	97.6	14.9	32.7	260.0	0.42
1987	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1988	125.3	108.9	1.7	24.6	261.9	0.35
1989	32.1	237.7	0.4	153.6	424.5	0.48
1990	32.0	375.3	13.6	220.7	642.4	0.55

Source : Estimated by TDRI

It is clear from the estimation that the price stabilization policy was very costly to the economy. Readers should be noted, however, that the above estimation is not exact and the deadweight loss estimated is only one of many types of losses generated by the policy. Other types of losses, some of which will be mentioned below, can still be felt today[1] :

- Illegal dilution: One problem caused by price distortion was the dilution of the more expensive fuels by cheaper ones as a result of unscrupulous trading practices. Various illegal dilution practices were prevalent in the first half of the 1980s. One well-known example was the adulteration of diesel with kerosene. The illicit dilution resulted in serious accidents which caused human and property losses.

[1] Piyasvasti Amranand and Tienchai Chongpeerapien, "Petroleum Product Pricing in Thailand", Energy Journal, Special South and Southeast Asia Pricing Issue 9, 1998

- Delay in the development of indigenous energy source: By keeping the price of fuel oil low in order to protect the power industry, plans for developing indigenous resource such as oil and natural gas were jeopardized.

- Refinery Loss: Refiners had to face imbalance of growth of domestic oil demand that caused diesel consumption to expand disproportionally high, compared to that of gasoline.

- Macro-economic impact: Keeping the retail prices of petroleum products low in face of the rising world prices is likely to cause a widening current account deficits and fiscal problems.

- Private cost: The stabilization policy also encouraged vehicles users to adapt or change their engines from gasoline-fuelled to diesel-or LPG-fuelled. In doing so, they incurred their private costs which were also the cost to the society. For example, the cost of changing from a gasoline engine to LPG was about 10,000 Baht while the cost of changing to diesel was 40,000 Baht. The changing of 20,000 taxi engines from gasoline-fuelled to LPG alone resulted in a net loss of 75 million Baht.

4.4 The Impact of the Single-price Policy

In this section, we will analyze the economic implications of the maintenance of a single price for oil products nationwide. Briefly speaking, the single-price policy is a kind of cross-subsidization policy; the prices of oil products sold in distant provinces are set below their actual costs with the cost-price difference subsidized by profits generated from sales in lower-cost areas which are presumably those close to the distribution center. The policy, first initiated by a former Minister of Commerce, was to be justified by the following arguments:

1) Single price is the fair price since everyone has to pay the same price.

2) Single price is the fair price since wealthier consumers in Bangkok and the Central Area of Thailand should subsidize poorer consumers in the provinces to promote greater income equity.

It is simple to see that the first argument is not valid. Since cross-subsidization implies that some people have to pay higher prices to subsidize others, a single-price policy is not "fair". The second argument, however, is not as simple to dispel.

The main issue to be discussed here is the impact of a single-price policy, if implemented, on the efficiency of the distribution network and the distribution of income. The implementation cost and the validity of government intervention will also be assessed. To begin the analysis, let us trace out steps that must be taken by the government if the policy were to be implemented:

1) The government sets and announces a nation-wide single-price for all oil products.

2) The government sets up a regulatory office to oversee the implementation of the policy including collecting profits from oil companies operating in low-cost areas close to the distribution center to compensate for the losses incurred by those operating in higher-cost areas in distant provinces.

3) The government might decide to intervene in the distribution of oil products to control the size of the losses, if necessary.

Determining the Optimal Single Price

Since the implementation of a single-price policy is a kind of cross-subsidization, the policy will distort the market prices and some economic losses will inevitably be incurred. Before such losses can be estimated, we must first determine the *optimal* single price of each oil product. The optimal price level would be the price level that would induce the least distortive consumption pattern. Roughly speaking, the optimal single price should be close to the average price in each of the provinces weighted against their respective consumption volumes[2].

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[2] More precisely, the optimal price, P^s, can be determined by solving the following equation: $\Sigma_i^{76} (P^s - P_i) Q_i^s = 0$, where P_i is the current price of each oil product in province i, Q_i^s is the consumption volume of the product of province i at the single price. Q_i^s can be estimated from the current consumption volume and the price elasticity of the demand of the product, ε_d as: $Q_i^s = Q_i + \varepsilon_d Q_i (P^s - P_i)/P_i$

Table 4.7 shows the optimal single prices for premium gasoline and high speed diesel estimated for the year 1995.

Deadweight Losses due to Consumption Distortion

With the estimated single price, we can now analyze the impact of a single-price policy. As is the case for any cross-subsidization scheme, the implementation of such a policy will confer benefits to consumers in distant provinces at the expense of consumers in areas close to the distribution center. Such benefits has to be weighted against the costs. The deadweight loss associated with resultant price distortion and administrative costs of implementing and maintaining such a policy will also have to be taken into consideration as well. The net deadweight loss due to consumption distortion can be represented as a sum of the following cost and benefit:

1. The benefit accrued to consumers in distant province
2. The cost accrued to consumers near the distribution center
3. The deadweight loss due to price distortion

Table 4.7 The Optimal Single Price for Each Oil Product

	Price (baht/litre)		
Product	Lowest Price (Cholburi Price)	Highest Price (Mae Hong Sorn Price)	Single Price
Unleaded Premium Gasoline	8.83	9.40	8.91
High-speed Diesel (0.05 g)	7.57	8.15	7.68

Note: the single price of each product is estimated from the prices and consumption volume in 1995.

If the single- price is set at the optimal level, then (1) and (2) will cancel each other out since all the losses from sales in distant provinces will be fully compensated for by profits generated from sales in areas close to the distribution center. Thus, the only type of loss that is left to be analyzed is the deadweight loss due to price distortion (3). The distortion results in over-consumption in distant provinces and under-consumption in provinces near the distribution center.

Table 4.9 Deadweight Loss in Unleaded Premium Gasoline Market due to the Single-price Policy

Region	Consumption Volume (thousand Ltrs/Yr)	Distorted Consumption (thousand Ltrs/Yr)	Deadweight Loss (Baht)
Bangkok Metropolitan	1,428,719	7,655	165,368
Central Region	251,048	1,520	45,360
Northern Region	248,979	4,295	381,547
Northeastern Region	187,695	2,133	151,442
Southern Region	186,095	3,432	319,312
Eastern Region	208,606	1,470	47,933
TOTAL	2,511,141	20,506	1,110,960

Note: the estimation is based on prices and consumption volume in 1995.

The fiscal cost of the enforcement

Simply deciding the optimal price for each product will not automatically result in the single-price market. This is because the oil distributors will have an incentive to distribute the oil products only to the provinces in which the single price is higher than the current price. In order to implement the policy, the government must have a mechanism to transfer revenues generated from provinces where the single price is higher than the current price to subsidize sales in provinces where the single price is lower than the current price. In the best-case scenarios, the government might be able to collect all the revenues generated in the profit-making areas, assuming all the distributors report the true sale volumes. In the worst-case scenario, however, all the products consumed in these provinces might not be reported at all, resulting in no revenues being collected. In this case, the net fiscal cost the government is thus the value of the market for every province where the

single price is lower than the current price[3]. Table 4.10 and 4.11 summarize the potential fiscal cost under such a scenario for each region.

[3] which is equivalent to: $\sum_i^{76} (P^s - P_i) Q_i^s$, for every province i such that $P_i > P^s$, where P^s is the single price, P_i is the current price of province i and Q_i^s is the quantity demanded in province i under the single price system.

It should be clear from the estimation that the single-price policy can be costly if not properly implemented. The fiscal cost estimated can be as high as 370 and 83 million baht per year in the case of high speed diesel and premium gasoline, respectively. These figures represent 0.54% and 0.37% of the market size of the two products.

Table 4.10 Fiscal Cost to Implement the Single-price Policy in High-speed Diesel (0.05 s) Market

Region	Subsidized Consumption (thousand Ltrs/Yr)	Fiscal Cost (Baht)
Bangkok Metropolitan	0	0
Central Region	82,203	8,976,645
Northern Region	1,143,220	120,442,718
Northeastern Region	1,201,896	102,854,322
Southern Region	1,174,053	129,282,718
Eastern Region	203,972	8,069,755
TOTAL	3,856,377	369,626,156

Note: the estimation is based on prices, consumption volume and transportation cost in 1995.

Table 4.11 Fiscal Cost to Implement the Single-price Policy in Unleaded Premium Gasoline Market

Region	Subsidized Consumption (thousand Ltrs/Yr)	Fiscal Cost (Baht)
Bangkok Metropolitan	0	0
Central Region	16,276	2,189,458
Northern Region	220,257	33,391,919
Northeastern Region	149,070	17,980,326
Southern Region	186,095	27,752,805
Eastern Region	31,232	1,703,482
TOTAL	602,929	83,017,991

Note: the estimation is based on prices, consumption volume and transportation cost in 1995.

The Impact on Equity

Proponents of the policy might still argue that although the policy results in inefficiencies, it should still be supported on the basis of wealth distribution; the rich in Bangkok and the Central Area should subsidize the poor in the provinces for the sake

of equity. Is this argument valid? We show that the policy is neither an effective nor an efficient tool to promote income distribution. Figure 4.3 shows a scatter diagram of all 76 provinces in Thailand plotted against its per-capita income (in thousand baht) and the level of subsidy it receives (in baht per liter).

While the figures shows that the policy results in many low-income provinces (Quadrant II) being subsidized and some high-income provinces being taxed (Quadrant IV), it should also be noted, however, that many low-income provinces are also penalized (Quadrant III) and a few high-income provinces subsidized (Quadrant I).

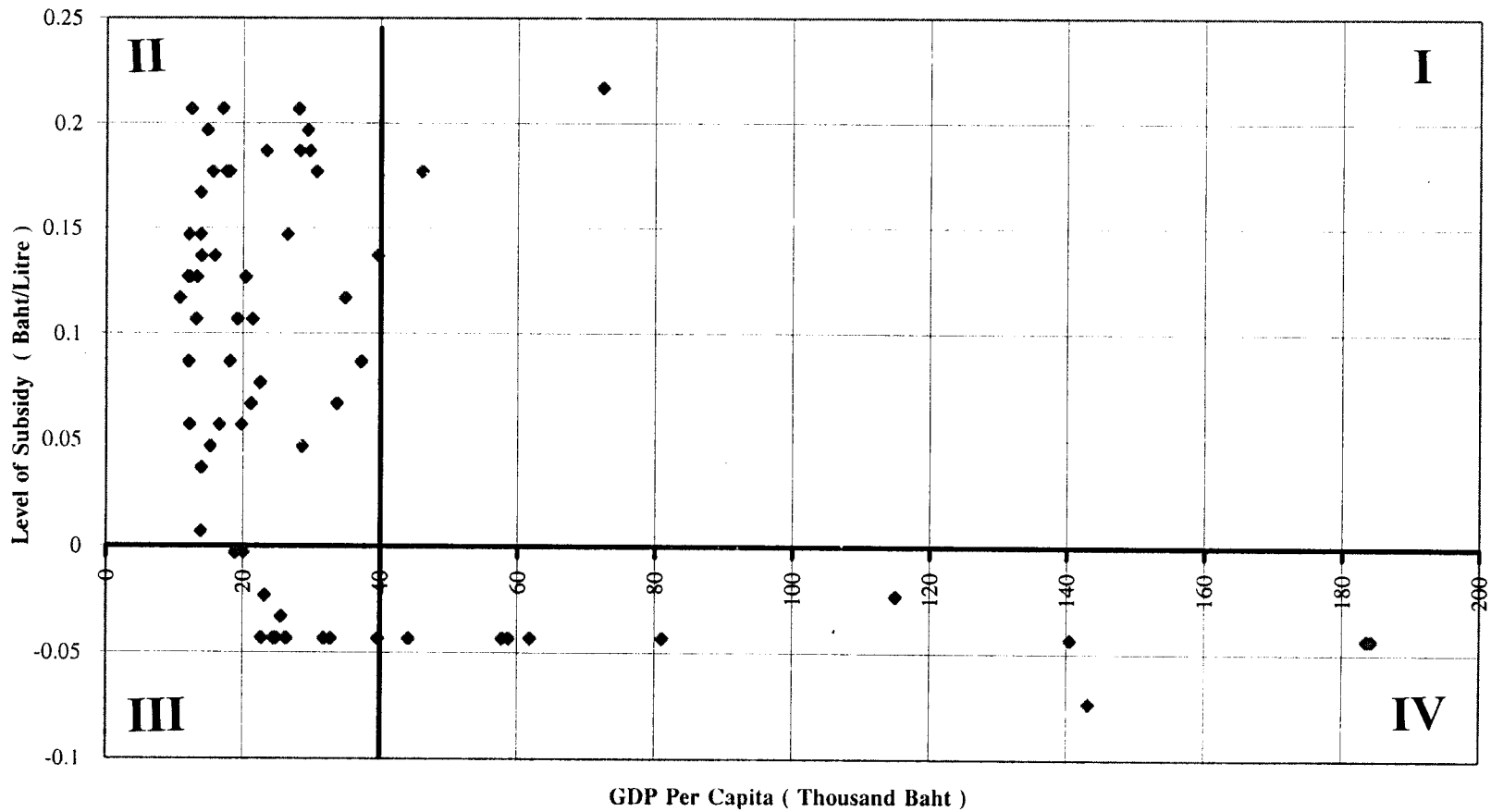
Deeper analysis also reveals more pitfalls of the policy. Firstly, the level of subsidy does not vary inversely with the level of income. Even in Quadrant II, many lower-income provinces receive less subsidy than higher-income provinces. Under an ideal subsidization scheme, the correlation of the level of subsidy and the level of income of the provinces should be -1.0. The calculated correlation of -0.39 reflects that the policy is far from ideal. Secondly, income is not evenly distributed in a province. Thus, while the policy may succeed in targeting many provinces with low income, it indiscriminately subsidizes both the rich and the poor within the province.

The above argument alone should refute any validity of using a single price policy as a means to promote income distribution. Should promoting income distribution be the goal of the government, a more straightforward and effective way to achieve such a goal would be to transfer lump-sum payments to the targeted groups in proportion with their level of poverty.

Policy Implication

It should be noted that while the single price policy discussed in this section is hypothetical, a weaker version of the policy is being implemented in Thailand. Currently the Ministry of Commerce is monitoring the oil price throughout the country with the monitored prices partially reflecting the real costs. For example, oil prices in the provinces within a radius of approximately 200 k.m. from Bangkok are expected to be the same as prices in Bangkok. As our analysis has clearly shown that the maintenance of a single-oil price generates net loss to the economy, the monitoring scheme cannot be economically justified.

Figure 4.3 Income Level and Level of Subsidy gained from Single Oil Price Policy



Chapter 5
The Impact of the Liberalization on the Retail Business

5.1 Introduction

The objective of this chapter is to analyze the effect of the oil price liberalization on the structure, conduct and profitability of retail business in Thailand. In the industry structure section, the study will explain the change in sales volume at retail stations, retail station construction and opinions of station operators concerning the effect of the deregulation on their business. In the industry conduct section, the study will evaluate the level of competition in retail business which will include entries by new oil companies. In the industry performance section, the study will highlight the level of retail station margins and the level of retail station profitability as found in the field survey.

5.2 Retail Industry Structure

The objective of this section is to analyze the change in retail oil industry structure since the deregulation of oil prices in 1991. The analysis will cover the change in the number of retail stations, retail volume, throughput per station, and how the deregulation could have affected these changes.

5.2.1 Retail station construction

a) Overall picture

Table 5.1 shows the total number of retail stations with legal permits between 1989 to 1997. There were 3,144 retail stations in Thailand in 1988 and the number stayed approximately at that level until 1990-1991. Since 1992, the number of retail stations have suddenly risen strongly from 3,764 stations to 5,765 stations in two years, and to 10,875 stations in five years. (see Table 5.1 and Figure 5.1). The rates of growth were particularly high during 1994-1995 when the number of stations grew 37.7% and 39% per year, respectively. The rate of growth began to fall in 1996 to 18.5% and down further to 14.5% in the second quarter of 1997.

Table 5.2 shows net annual change in the total number of retail stations. Since the figures are net changes, the construction of new retail stations were higher than what were shown in the table. During the late 1980s, net annual increases in retail stations were slightly over 100. The figure rose to about 200 net new stations per year at the time of the deregulation. However, planning for major new retail station construction to take advantage of the expanded retail margins probably took place around 1992. Since it took over a year to plan for station construction and to acquire necessary permits, the retail station boom actually started in 1994 when 1,579 net new stations were added to the network compared to 100-200 net new stations per year four to five years earlier. In 1995, 2,249 net new stations were added to the network. (see Figure 5.2) 1995 was the year when the activity reached its peak and the industry began to make the adjustment as certain areas of the country were 'flooded' with over-supplies of oil pumps.

However, the adjustment process was slow to occur as the net new additions of retail stations were still quite strong until the first half of 1997 when 1,375 net new stations opened for business.

Overall, 6,688 net new stations were added to the network during 1994-1997 bringing the total number of registered stations to 10,874 by mid-1997. The average annual growth rate of retail stations in Thailand has been 20.95% since the deregulation in 1991.

b) Number of retail stations by company

Table 5.3 shows a break down of number of retail stations by oil companies. The Department of Commercial Registration, Ministry of Commerce has classified the stations into two groups as follows.

- Article 6 oil companies which could be further classified into
  - major oil brands defined here to include PTT, Shell, Esso, Caltex, and Bangchak (BCP)
  - "independent" brands defined here to include all other Article 6 companies, some of which are international giants but having small retail networks in the Thai market such as BP, Jet, Mobil and Q8.
- Non-Article 6 companies. These are truly independent stations as they are not formally affiliated with any oil brands. Thai laws allow construction of independent stations which are typically family owned and operated. Most of these stations are very small having one or two dispensers and normally sell high speed diesel (HSD) as the only main product. 'Skid-tank' stations are also included in this category.

Table 5.1 Total Number of Retail Stations

Year	Stations	Growth Rate (%)
1988	3,144	
1989	3,272	4.07
1991	3,473	6.14
1992	3,7604	8.38
1993	4,186	11.21
1994	5,765	37.72
1995	8,014	39.01
1996	9,495	18.48
1997*	10,874	14.52

Source : Fuel Oil Division, Department of Commercial Registration, Ministry of Commerce.

1997* : Jan-Jun

Figure 5.1 Total Number of Retail Stations

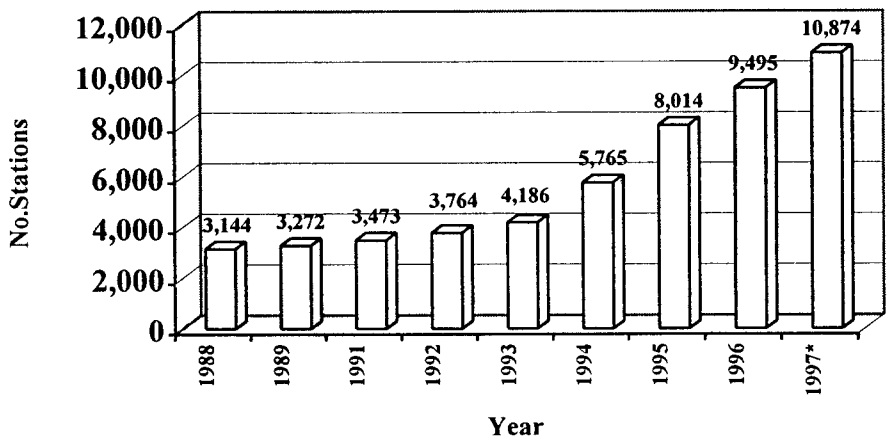


Table 5.2 Net Annual Change in Retail Stations

Year	Stations	Change
1988	3,144	
1989	3,272	128
1991	3,473	201
1992	3,764	291
1993	4,186	422
1994	5,765	1,579
1995	8,014	2,249
1996	9,495	1,481
1997*	10,874	1,379

Source : Fuel Oil Division, Department of Commercial Registration, Ministry of Commerce.

Figure 5.2 Net Annual Change in Retail Stations

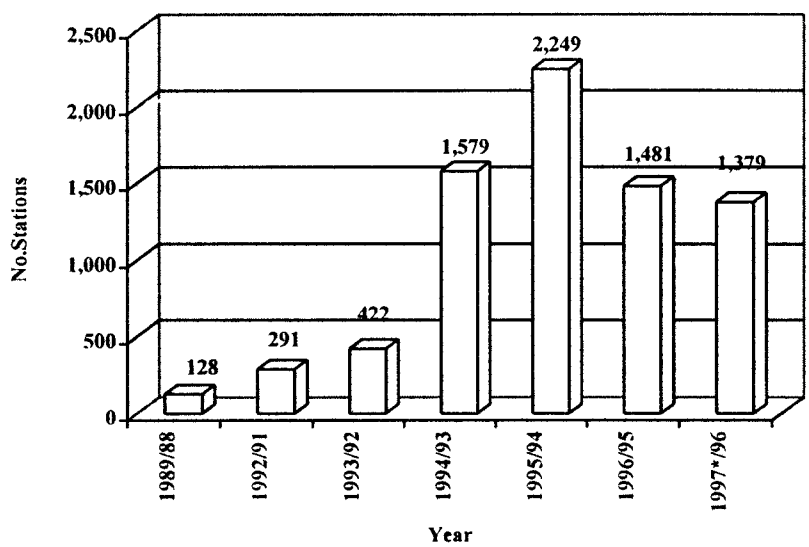


Table 5.3 Number of Retail Stations by Company

	1989	1991	1992	1993	1994	1995	1996	1997*
PTT	1,008	967	1,025	1,223	1,290	1,405	1,525	1,508
Shell	711	896	915	955	991	1,017	1,057	1,065
Esso	667	711	756	763	811	828	846	857
Caltex	550	513	547	563	589	585	564	557
BCP	0	13	36	113	659	892	1,095	1,133
Total Majors	**2,936**	**3,100**	**3,279**	**3,617**	**4,340**	**4,727**	**5,087**	**5,120**
Susco	0	58	96	111	122	135	160	220
Cosmo	0	0	0	31	67	125	181	191
Mobil	0	39	50	54	66	89	79	81
Sukhothai	0	0	0	0	21	56	89	89
MP	0	0	0	0	0	68	136	149
BP	0	11	25	31	38	42	47	47
Q8	0	12	23	36	52	69	88	97
PT	0	0	0	7	110	202	307	332
TPI	0	0	0	0	0	50	93	112
JET	0	0	0	8	19	27	61	67
PA	0	0	0	0	0	356	453	458
Total Independents	**0**	**120**	**194**	**278**	**495**	**1,219**	**1,694**	**1,843**
Total Majors and Independents	**2,936**	**3,220**	**3,473**	**3,895**	**4,835**	**5,946**	**6,781**	**6,963**
Non - Article 6	**336**	**253**	**291**	**291**	**930**	**2,068**	**2,714**	**3,911**
Total	**3,272**	**3,473**	**3,764**	**4,186**	**5,765**	**8,014**	**9,495**	**10,874**

Source : Fuel Oil Division, Department of Commercial Registration, Ministry of Commerce.

1997* : Jan-Jun

1. majors and independents

According to Table 5.3, PTT led the major companies in terms of number of outlets. PTT stations were about 1,000 during 1989-1992. The number then grew strongly to over 1,500 in 1996-1997. The average annual rate of growth of PTT stations during 1991-1997 was 7.7%.

Bangchak was certainly the highest growth company in terms of outlet expansion. The company entered retail sales in 1991 with a 13 station network. The number of Bangchak stations took off in 1994 with over 500 new stations added to the network in a single year. The total number of stations have since climbed

continuously to 1,133 in mid-1997. The growth rate of Bangchak network during 1991-1997 was astonishing at 100% per year. However, much of these stations were co-operative stations which were skid-tank type. Skid-tank stations were inexpensive and fast to build. Nonetheless, Bangchak's network, skid-tank stations included, is now the second largest in the country behind PTT's.

Shell, the largest international retail network in Thailand, came third with 1,065 stations in 1997. However, Shell's network has not been expanding since 1995 and Shell appears to be maintaining a 1,000 station network for the time being. The same is true for ESSO which has been maintaining the size of its network at over 800 stations since 1994. Both Shell and ESSO have added about 15-25 net new stations a year each during the past few years. Apparently, they have become cautious and selective in building their networks under intense competition.

Caltex is different from all other major companies in terms of network expansion. Caltex network has remained practically static since 1988 at 550 stations. Some new Caltex stations were built while about the same number were closed down. The company appears to be more interested in modernizing its network rather than expanding it. However, Caltex has taken over the entire BP's network Since December 1997 which will effectively boost Caltex 's stations to over 600.

Overall, the number of major oil companies stations grew from 2,936 in 1989 to 5,120 in mid-1997. The average annual growth rate has been about 8.3% during the period. About 310 net new stations were built each year by these oil companies.

On the other hand, retail station networks of independents have been characterized by high growth since the deregulation. None of the independents engaged in retail sales prior to the deregulation (see Table 5.3). At that time, independent companies were mainly Thai owned companies whose main business was wholesale sales through jobbers or other wholesale channels. Although most of their products finally found their ways to retail markets via drum-pumps or skid-tanks, independents were not interested in developing formal retail network of their own.

After the deregulation, independent networks began to develop. Initial group of companies to enter formal retail sales included SUSCO and international brands like BP, Mobil and Q8. The total size of the network was relatively small at first, then followed by a strong 'burst' of investment during mid-1990s. Companies like COSMO, PT and later on PA joined the race and boosted the size of the network

from over 200 in 1993 to 1,219 stations in 1995. By mid-1997, the network size reached 1,843 stations making average annual growth rate during 1991-1997 of a strong 57.7%.

However, a big jump in the network size starting in 1995 may partly be the result of a stronger enforcement of the Public Works Department to register some of the informal stations like skid-tanks in order to increase public safety as these stations must comply with safety regulations in order to receive operating permits.

Table 5.3 also shows the combined number of retail stations of majors and independents. The number of stations rose from 2,936 stations in 1989 (all majors) to 6,963 stations at present. The average annual growth rate during the period was 13.1%.

2. non-Article 6 stations

As said earlier, these are truly independent stations owned and operated mainly as family business. The stations are located typically in rural and up-country areas and a large number of them are skid-tank type stations selling only HSD. Gasoline sales, if any, are in the form of hand-operated drum-pumps.

As shown in Table 5.3, the number of these stations were stable at 2-300 stations before 1994. The number then jumped to 2,068 in 1995 and to 3,911 in 1997. This is partly the result of the enforcement of the Public Works Department to mandate the stations to register and come under safety rules as in the case of formal stations. The growth has also been the result of strong competition in retail sales in rural areas. The use of skid-tank pumps have now become widespread and have replaced traditional drum-pump business in up-country provinces.

3. station shares

Table 5.4 and Figure 5.3 and 5.4 show the shares of retail stations operated by majors, independents and non-Article 6 operators. In 1989, the station share of major companies was nearly 90%. The share was eroded slowly in the early 1990s, and then rapidly at around mid-1990s. By 1994, the share fell to 75% and by mid 1997, the share plunged to 47%. Individually, PTT used to have 30% station share in 1989. Its current share is now only 13.9%. Shell, Esso and Caltex are all losing station shares from 16-20% in 1989 to 5-10% at present. Bangchak is the only major to gain the share before 1997. Now the company share has also been affected.

As for independents, their combined station share has grown rapidly throughout the period. The share now stands at about 17% compared to 3.5% in 1991.

PT and PA are the two highly aggressive independent companies in terms of retail station construction. Their shares now stand at 3.05% and 4.21%, respectively. Cosmo and MP are also aggressive and have been able to build significant retail networks in a short time span.

Table 5.4 Share of Retail Stations by Company

Unit : %

	1989	1991	1992	1993	1994	1995	1996	1997*
PTT	30.81	27.84	27.23	29.22	22.38	17.53	16.06	13.87
Shell	21.73	25.80	24.31	22.81	17.19	12.69	11.13	9.79
Esso	20.39	20.47	20.09	18.23	14.07	10.33	8.91	7.88
Caltex	16.81	14.77	14.53	13.45	10.22	7.30	5.94	5.12
BCP	0.00	0.37	0.96	2.70	11.43	11.13	11.53	10.42
Total Majors	89.73	89.26	87.11	86.41	75.28	58.98	53.58	47.08
Susco	0.00	1.67	2.55	2.65	2.12	1.68	1.69	2.02
Cosmo	0.00	0.00	0.00	0.74	1.16	1.56	1.91	1.76
Mobil	0.00	1.12	1.33	1.29	1.14	1.11	0.83	0.74
Sukhothai	0.00	0.00	0.00	0.00	0.36	0.70	0.94	0.82
MP	0.00	0.00	0.00	0.00	0.00	0.85	1.43	1.37
BP	0.00	0.32	0.66	0.74	0.66	0.52	0.49	0.43
Q8	0.00	0.35	0.61	0.86	0.90	0.86	0.93	0.89
PT	0.00	0.00	0.00	0.17	1.91	2.52	3.23	3.05
TPI	0.00	0.00	0.00	0.00	0.00	0.62	0.98	1.03
JET	0.00	0.00	0.00	0.19	0.33	0.34	0.64	0.62
PA	0.00	0.00	0.00	0.00	0.00	4.44	4.77	4.21
Total Independents	0.00	3.46	5.15	6.64	8.59	15.21	17.84	16.95
Total Majors and Independents	89.73	92.72	92.27	93.05	83.87	74.20	71.42	64.03
Non - Article 6	10.27	7.28	7.73	6.95	16.13	25.80	28.58	35.97
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1997* : Jan-Jun

Figure 5.3 Share of Retail Stations by Company (1989)

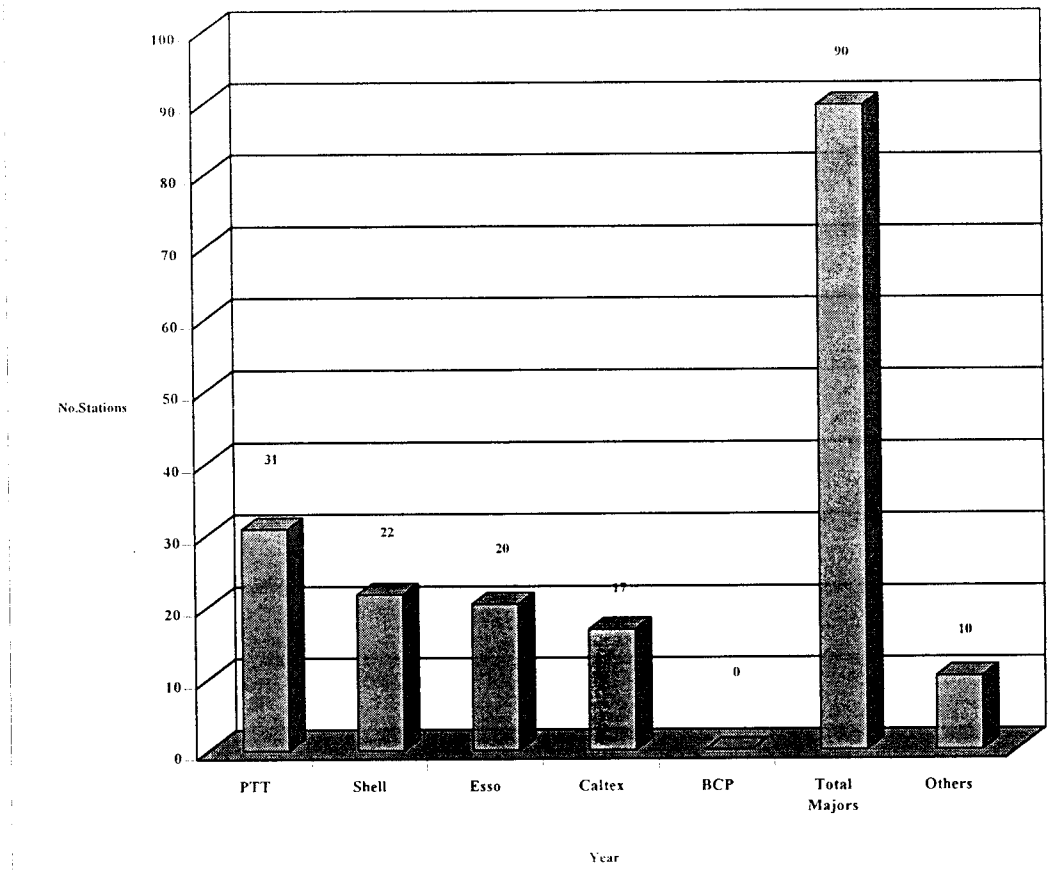
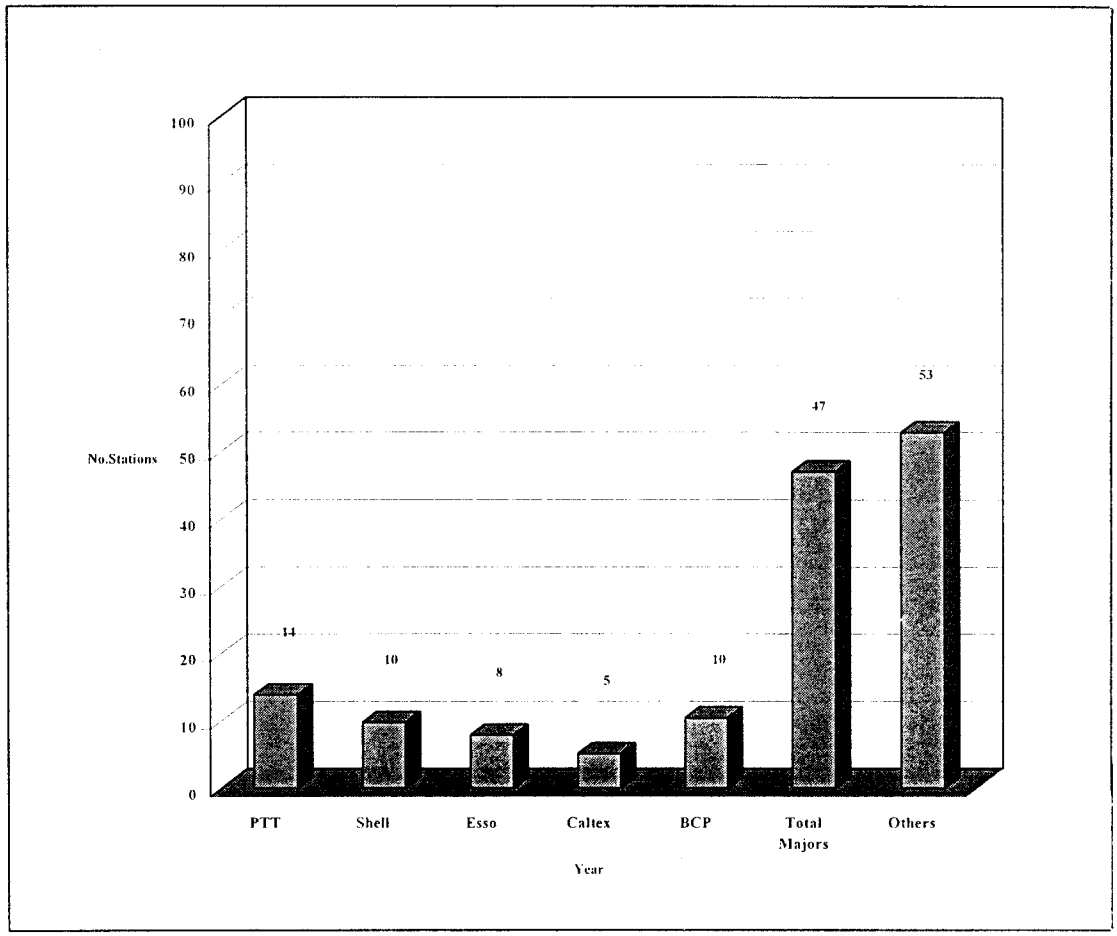


Figure 5.4 Share of Retail Stations by Company (Jan-Jun 1997)



Jet is an international firm and is a new comer in the Thai market. The company was expanding the network quite rapidly at first, but has since slowed down and has maintained its share at about 0.6%. Mobil and Q8, the largest foreign independents, have maintained their shares at about 0.7 - 0.9%. BP has already ceased retail station operation in Thailand. Since December 1997, BP's stations were taken over by Caltex.

The combined share of non-Article 6 stations has now stood at 35.9%. The share of non-Article 6 stations will probably continue to rise in the future as vast areas of rural Thailand will have to be serviced by this type of low cost informal stations.

5.2.2 Retail volume

a) Total gasoline and HSD volume

Gasoline and diesel fuel (HSD) are the two main products being sold in Thai retail oil market. Although there are several grades of gasoline in the Thai market, they will be grouped together in this study as total gasoline. Table 5.5 shows total gasoline and HSD sales during 1988 to 1997 broken down by oil company. Total gasoline sales, which included retail and non-retail consumption, in 1988 was 2,923 million liters. The volume grew quickly to 3,896 million liters in 1991 and to 5,662 million liters in 1996. The average rate of growth during 1988-1996 was 8.6% per year. However, the rate of growth of gasoline sales in the country fell to - 2% during January - September, 1997 compared to the same period in 1996. This has been the result of a serious down turn in the Thai economy after mid-1997.

Major oil companies have dominated gasoline sales in Thailand. The combined market share of the five major oil companies was 99.9% in 1988. The share has continued to be strong despite the growth of independent companies in recent years. (see Table 5.6) The major companies have been able to capture 81.5% of the total gasoline share in 1997.

Table 5.5 Total Gasoline and HSD Volume

	1988		1991		1996		1996*		1997*		Growth Rate (%) 1988/1987		1991/1990		1996/1995		1997*/1996*	
	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline*	HSD*	Gasoline*	HSD*	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline*	HSD*
PTT	695	1,530	1,008	2,471	1,672	5,115	1,264	3,787	1,386	3,487	12	10	15	5	5	22	10	-8
Shell	835	1,735	1,123	2,374	1,608	2,719	1,253	2,105	1,098	1,634	10	11	2	-2	0	-4	-12	-22
Esso	796	1,776	979	2,356	1,285	2,924	967	2,286	951	1,856	16	15	1	-2	-5	4	-2	-19
Caltex	573	1,255	604	1,379	800	1,361	592	1,018	661	1,168	9	11	-7	-11	2	3	12	15
BCP	22	40	121	260	460	1,013	287	639	417	830	429	1,085	65	11	24	31	45	30
Total Majors	**2,920**	**6,335**	**3,835**	**8,840**	**5,825**	**13,132**	**4,362**	**9,834**	**4,513**	**8,974**	**13**	**12**	**5**	**-1**	**2**	**10**	**3**	**-9**
Unique Gas	0	0	0	0	0		0	94	0	0	0	0	0	0	0	0	0	-100
World Gas	0	0	0	0	0		0	20	0	0	0	0	0	0	0	0	-100	-100
Gas Siam	0	269	0	242	23	138	20	112	7	68	0	32	0	3	-22	-24	-64	-39
World Petroleum	0	148	15	114	12	112	7	145	3	45	0	6	0	-6	13	-6	-48	-69
Siam United Servic	0	171	31	157	66	310	47	241	52	200	0	-2	0	-1	19	52	11	-17
Cosmo Industry	0	128	0	102	172	626	131	415	83	176	0	10	0	-9	38	13	-37	-57
Chareon Mankong	0	117	0	114	40	108	543	0	30	89	0	307	0	-6	55	-13	-95	0
Hard Oil	0	3	0	46	0		0	0	0	0	0	-60	0	36	0	0	0	0
Mobil	3	19	9	46	89	155	66	119	65	85	33	2	405	346	42	10	-1	-29
Paktai Chuepleng	0	0	0	148	215	843	157	654	188	540	0	0	0	146	37	-7	20	-17
P.C. Siam	0	0	0	0	17	237	13	197	11	92	0	0	0	0	21	-4	-18	-53
Thai Oil	0	0	0	0	20	26	14	16	19	41	0	0	0	0	-45	-60	30	150
Sukhothai	0	0	0	0	0	108	0	68	0	40	0	0	0	0	0	-32	0	-42
MP	0	0	0	0	154	1,103	104	851	185	734	0	0	0	0	271	98	78	-14
Q8	0	0	0	0	164	218	119	164	119	192	0	0	0	0	736	495	0	17
BP OIL	0	0	0	0	51	73	33	47	54	73	0	0	0	0	0	0	64	56
TISCO	0	0	0	0	0	0	0	52	1	40	0	0	0	0	-100	-100	0	-23
TPI	0	0	0	0	31	180	31	180	0	1	0	0	0	0	106	44	-100	-99
TPI OIL	0	0	0	0	41	216	14	68	150	515	0	0	0	0	0	0	979	655
Siam Chemi	0	0	0	0	0	6	0	0	0	22	0	0	0	0	0	0	0	10,688
TIPCO ASF.	0	0	0	0	0	77	0	0	0	0	0	0	0	0	0	0	0	0
Namon Easan	0	0	0	0	0	0	0	0	0	0	0	-100	0	0	0	0	0	0
Jet	0	0	0	0	0	0	0	0	56	60	0	0	0	0	0	0	0	0
Total Indept.	**3**	**854**	**56**	**969**	**1,093**	**4,534**	**1,299**	**3,444**	**1,023**	**3,012**	**33**	**22**	**3,103**	**14**	**85**	**31**	**-21**	**-13**
Total	**2,923**	**7,189**	**3,890**	**9,809**	**6,918**	**17,666**	**5,662**	**13,279**	**5,537**	**11,986**	**13**	**13**	**6**	**0**	**10**	**15**	**-2**	**-10**

Source : Fuel Oil Division, Department of Commercial Registration, Ministry of Commerce.

* : Jan- Sept

In the case of HSD, total sales volume of the industry was 7,189 million liters in 1988. The volume grew to 9,809 million liters in 1991 and to 17,666 million liters in 1996. The average annual growth rate during the period was 12.5%. However, the rate of growth fell to - 9.74% during January - September 1997 compared to the same period last year because of the poor economy as stated above.

Table 5.6 shows HSD market shares of the oil companies. The combined share of the majors was 88.1% in 1988. The share rose to 90.1% in 1991 when the deregulation was first introduced. After 1991, the deregulation effectively stimulated entries into the business and the volume of the independents have grown over the years. The combined market share of the majors thus eroded from 90.1% in 1991 to 74.3% in 1996 while total independents' share grew to 25.7% in the same period. Note that the HSD volume and market shares above did not take into account unknown amount of smuggled HSD which could distort the share figures. Nonetheless, we will not attempt to estimate smuggled HSD volume in this report.

a) Retail volume

Retail volume here is defined as the amount of gasoline and HSD that are sold through retail stations as reported by oil companies to the Commercial Registration Department, Ministry of Commerce. All Article 6 companies are required to make routine monthly reports to the Department which include monthly sales to customers by customer group or 'account'. The data from most oil companies are fairly reliable although it is still questionable that the definition of retail sales may be interpreted slightly differently between the oil companies. However, the data from certain oil companies are questionable, particularly when the data are used to calculate throughput per station. (see below)

Table 5.7 shows the retail sales data of the oil companies. These are sales volume by the Article 6 companies only. In 1992, major oil companies completely dominated the retail markets for gasoline and HSD. Total retail sales of gasoline by the four major companies which were PTT, Shell, Esso and Caltex were 3,166 liters compared to 43 million liters by independents and 16 million liters by Bangchak. The combined market share of the four majors was 98.7%.

Table 5.6 Share of Gasoline and HSD Volume

Unit : %

	1988		1991		1996		1996*		1997*	
	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline*	HSD*	Gasoline*	HSD*
PTT	23.78	21.27	25.91	25.19	24.17	28.95	22.32	28.52	25.04	29.09
Shell	28.56	24.13	28.86	24.20	23.24	15.39	22.13	15.85	19.84	13.63
Esso	27.24	24.70	25.16	24.02	18.58	16.55	17.08	17.21	17.17	15.48
Caltex	19.59	17.46	15.54	14.06	11.56	7.71	10.46	7.66	11.94	9.74
BCP	0.74	0.55	3.11	2.65	6.65	5.73	5.06	4.81	7.53	6.92
Total Majors	99.90	88.12	98.57	90.12	84.20	74.33	77.05	74.06	81.52	74.87
Unique Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.00	0.00
World Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00
Gas Siam	0.00	3.74	0.00	2.47	0.34	0.78	0.36	0.84	0.13	0.57
World Petroleum	0.00	2.06	0.40	1.16	0.17	0.63	0.12	1.10	0.06	0.37
Siam United Service	0.00	2.38	0.81	1.60	0.95	1.75	0.82	1.81	0.93	1.67
Cosmo Industry	0.00	1.79	0.00	1.04	2.48	3.55	2.32	3.12	1.50	1.47
Chareon Mankong	0.00	1.62	0.00	1.17	0.57	0.61	9.59	0.00	0.54	0.74
Hard Oil	0.00	0.04	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00
Mobil	0.10	0.26	0.23	0.47	1.28	0.88	1.17	0.90	1.18	0.71
Paktai Chuepleng	0.00	0.00	0.00	1.51	3.11	4.77	2.77	4.93	3.39	4.51
P.C. Siam	0.00	0.00	0.00	0.00	0.25	1.34	0.24	1.48	0.20	0.77
Thai Oil	0.00	0.00	0.00	0.00	0.28	0.15	0.26	0.12	0.34	0.34
Sukhothai	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.51	0.00	0.33
MP	0.00	0.00	0.00	0.00	2.22	6.24	1.84	6.41	3.35	6.12
Q8	0.00	0.00	0.00	0.00	2.38	1.24	2.11	1.24	2.15	1.60
BP OIL	0.00	0.00	0.00	0.00	0.73	0.41	0.58	0.35	0.97	0.61
TISCO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.01	0.33
TPI	0.00	0.00	0.00	0.00	0.44	1.02	0.54	1.35	0.00	0.01
TPI OIL	0.00	0.00	0.00	0.00	0.59	1.22	0.25	0.51	2.72	4.30
Siam Chemi	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.18
TIPCO ASF.	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00
Namon Easan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.02	0.50
Total Indept.	0.10	11.88	1.43	9.88	15.80	25.67	22.95	25.94	18.48	25.13
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source : Fuei Oil Division, Department of Commercial Registration, Ministry of Commerce.

* : Jan- Sept

Table 5.7 Retail Gasoline and HSD Volume

	1992		1993		1994		1995		1996		1997*	
	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD
PTT	946	2,041	1,177	2,281	1,241	2,111	1,381	2,618	1,366	2,797	806	1,860
Shell	992	1,914	1,320	1,956	1,462	2,119	1,498	2,151	1,495	2,000	721	955
Esso	814	1,712	966	1,672	1,070	1,826	1,069	1,828	1,089	2,023	541	1,054
Caltex	399	679	596	835	648	857	677	893	656	821	364	558
BCP	16	19	78	148	187	304	351	514	448	751	234	491
Total Majors	**3,166**	**6,365**	**4,137**	**6,890**	**4,608**	**7,217**	**4,977**	**8,004**	**5,053**	**8,393**	**2,665**	**4,918**
Susco	26	62	33	84	42	97	51	114	51	120	1	59
Chareon Mankong	0	0	0	0	0	0	2	0	0	0	0	0
World Petroleum	1	3	1	1	1	1	1	1	1	2	24	1
Cosmo	0	0	0	0	5	5	22	39	40	77	0	14
PT	0	0	0	0	2	1	7	1	45	106	7	195
Gas Siam	0	0	0	0	0	0	1	0	0	0	0	0
Mobil	15	44	27	64	39	106	62	140	85	153	29	65
PC Siam	0	22	0	33	0	38	0	80	4	99	40	42
Thai Oil	1	4	22	23	38	71	36	65	20	26	48	29
BP	0	0	0	0	0	0	0	0	51	71	9	51
Sukhothai	0	0	0	0	0	8	0	23	0	8	35	4
MP	0	0	0	0	0	0	35	404	116	573	91	500
Q8	0	0	0	0	0	0	11	33	94	207	47	95
TPI Oil	0	0	0	0	0	0	0	0	7	14	10	24
Total Independents	**43**	**136**	**83**	**207**	**126**	**326**	**229**	**901**	**514**	**1,456**	**342**	**1,079**
Total	**3,209**	**6,501**	**4,220**	**7,097**	**4,734**	**7,543**	**5,205**	**8,905**	**5,567**	**9,849**	**3,007**	**5,997**

Source : Fuel Oil Division, Department of Commercial Registration, Ministry of Commerce.

Note : Jet was granted Articlr 6 license in July 1997

* : Jan-Jun

Table 5.8 Growth Rate of Retail Gasoline and HSD Volume

	1993		1994		1995		1996		1997*	
	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD
PTT	24.51	11.75	5.42	-7.43	11.29	24.02	-1.10	6.82	-40.99	-33.49
Shell	33.15	2.15	10.73	8.38	2.50	1.49	-0.23	-7.01	-51.80	-52.26
Esso	18.72	-2.37	10.76	9.22	-0.13	0.14	1.89	10.67	-50.33	-47.91
Caltex	49.26	23.10	8.77	2.57	4.47	4.18	-3.18	-7.96	-44.53	-32.03
BCP	383.56	659.08	140.28	105.90	88.06	69.24	27.56	46.08	-47.72	-34.65
Total Majors	**30.67**	**8.25**	**11.37**	**4.74**	**8.00**	**10.91**	**1.54**	**4.86**	**-47.26**	**-41.40**
Susco	28.70	35.27	26.52	14.43	22.34	18.31	-0.15	4.82	-98.21	-50.75
Chareon Mankong	0.00	0.00	0.00	0.00	0.00	0.00	-100.00	0.00	0.00	0.00
World Petroleum	-4.05	-58.36	-14.06	0.21	33.53	-5.47	-6.82	17.37	2,190.80	-43.83
Cosmo	0.00	0.00	0.00	0.00	342.85	760.00	80.38	97.97	-99.14	-82.05
PT	0.00	0.00	0.00	0.00	311.26	-26.89	537.96	17,288.18	-84.52	83.73
Gas Siam	0.00	0.00	0.00	0.00	0.00	0.00	-100.00	0.00	0.00	0.00
Mobil	77.26	47.13	44.49	64.71	61.06	31.60	36.77	9.69	-66.53	-57.79
PC Siam	0.00	47.40	0.00	14.21	0.00	112.69	4,472.62	23.65	933.61	-57.23
Thai Oil	2,064.29	468.97	74.67	201.54	-5.27	-8.40	-45.50	-59.59	145.10	12.52
BP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-81.51	-27.98
Sukhothai	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-67.56	0.00	-51.80
MP	0.00	0.00	0.00	0.00	0.00	0.00	231.10	41.67	-21.28	-12.73
Q8	0.00	0.00	0.00	0.00	0.00	0.00	773.23	531.67	-49.45	-54.29
TPI Oil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.05	77.38
Total Independents	**93.02**	**51.85**	**52.79**	**57.61**	**81.03**	**176.26**	**124.79**	**61.70**	**-33.41**	**-25.89**
Total	**31.50**	**9.17**	**12.18**	**6.28**	**9.95**	**18.06**	**6.95**	**10.61**	**-45.98**	**-39.11**

Source : Fuel Oil Division, Department of Commercial Registration, Ministry of Commerce.

Note : Jet was granted Articlr 6 license in July 1997

*: Jan-Jun

As for HSD, the four major companies controlled 97.9% of the retail market in 1992. Independents including Bangchak were only minor retailers of oil products at that time. (see Table 5.9)

A few years after the 1991 deregulation, the retail picture began to change. Independent companies began to enter retail market while the major companies attempted to secure their footholds by expanding and upgrading their networks. The primary reasons for the oil companies to have strong interests in retail sales at that time are as follows.

- Retail margins had become more attractive after the deregulation. Not only that the absolute margins were adjusted upward significantly, but the oil companies were free to price their products, and the margins, as they think appropriate under the prevailing competition.

- The revision of the Public Works regulation concerning retail station construction had made it easier and less costly to build a station.

- Oil demand in Thailand had continued to grow strongly each year. Strong growth in the sales of motor vehicles, particularly pickups and motorcycles, had caused the demand for retail oil products rising very rapidly.

- Independents including Bangchak who were engaging only in wholesale sales had all shifting to building their own retail networks. Not only that they were expecting to profit from stronger retail margins, but more significantly so to find a more steady channel for the flow of their oil supplies. Wholesale market was known to be fiercely competitive in Thailand and the margins were very poor.

- Retail network could be used as a base for the sales of other highly profitable oil products, oil and non-oil services.

According to Table 5.7, retail sales volume of HSD by independents rose from 136 million liters in 1992 to 901 million liters in 1995 and further to 1,079 million liters in the first half of 1997. As said earlier, these were just the reported volume. In any case, the HSD market share of independents rose from 2.1% in 1992 to 10.1% in 1995 and to 18% in 1997. This has clearly been a significant gain as independents have now captured one fifth of the retail sales. (see Table 5.9)

Thus it could be said that the deregulation has clearly stimulated stronger retail sales competition. Independent companies have become strong in retail sales but they still have a long way to go to become a strong contender to the major oil companies.

5.2.3 Throughput per station

Throughput per station is one of the common measurements of the 'health' of retail industry. Throughput per station here is defined as an average monthly retail sales volume of gasoline and HSD per retail station. This is strictly a measurement of retail sales as the wholesale volume sold by certain retail stations were excluded.

Table 5.10 shows the detail of monthly throughput per station statistics. The figures were calculated from the reported data obtained from the Department of Commercial Registration. Although some might say that the data are questionable, particularly for some independent companies, we still think the information is still useful in showing the trend of throughputs over the years. Furthermore, the data must be interpreted carefully and must by verified by field surveys. Our survey results, shown below, indicate that the reported data from the major oil companies and some independents are quite reasonable.

In 1992, Esso led all other companies in terms of average station throughput. The company could sell about 291,937 liters of gasoline and HSD per station per month compared to 281,362 liters of Shell and 249,577 liters of PTT. Caltex, on the other hand, could only sell 208,000 liters per station per month. Bangchak's station throughput was naturally lower than the other majors since Bangchak had a significant number of co-operative stations in its network. The average monthly throughput of Bangchak stations was only 92,514 liters. This level of the station throughput is still being maintained today.

After the deregulation, both Esso and Shell average station throughputs have been declining. Esso's station throughput fell to 291,000 liters per month in 1995 and has since gained the average volume to 310,000 liters per month today. On the other hand, Shell has been steadily losing its average station throughput throughout the period. The volume per station has now fallen to 262,000 liters per month. PTT's situation is similar to that of Shell. The throughput was steadily declining over the years but has recently been rising back to the previous level of 294,600 liters per month. PTT's performance has been impressive since the company has been expanding the network rapidly but has been able to maintain its throughput per station at above the industry average.

Table 5.9 Share of Retail Volume of Gasoline and HSD by Company

Unit : %

	1992		1993		1994		1995		1996		1997*	
	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD	Gasoline	HSD
PTT	29.47	31.39	27.90	32.13	26.22	27.99	26.54	29.40	24.54	28.39	26.80	31.01
Shell	30.90	29.45	31.29	27.55	30.88	28.10	28.79	24.16	26.85	20.31	23.96	15.92
Esso	25.36	26.34	22.89	23.55	22.60	24.20	20.53	20.53	19.56	20.54	17.98	17.57
Caltex	12.44	10.44	14.12	11.77	13.69	11.36	13.01	10.02	11.78	8.34	12.09	9.31
BCP	0.50	0.30	1.84	2.08	3.94	4.03	6.74	5.78	8.04	7.63	7.78	8.19
Total Majors	98.67	97.91	98.04	97.09	97.33	95.68	95.61	89.89	90.77	85.22	88.63	82.01
Susco	0.80	0.96	0.78	1.19	0.88	1.28	0.98	1.28	0.92	1.22	0.03	0.98
Chareon Mankong	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
World Petroleum	0.03	0.05	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.81	0.01
Cosmo	0.00	0.00	0.00	0.00	0.11	0.06	0.43	0.44	0.72	0.78	0.01	0.23
PT	0.00	0.00	0.00	0 00	0.04	0.01	0.14	0.01	0.82	1.08	0.23	3.24
Gas Siam	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Mobil	0.47	0.67	0.64	0.91	0.82	1.41	1.20	1.57	1.53	1.56	0.95	1.08
PC Siam	0.00	0.34	0.00	0.47	0.00	0.50	0 00	0.90	0.07	1.01	1.32	0.71
Thai Oil	0.03	0.06	0.52	0.33	0.80	0.94	0.69	0.73	0.35	0.27	1.60	0.49
BP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.72	0.31	0.86
Sukhothai	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.26	0.00	0.08	1.17	0.06
MP	0.00	0.00	0.00	0.00	0.00	0.00	0.67	4.54	2.08	5.82	3.03	8.33
Q8	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.37	1.69	2.11	1.58	1.58
TPI Oil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.14	0.32	0.41
Total Independents	1.33	2.09	1.96	2.91	2.67	4.32	4.39	10.11	9.23	14.78	11.37	17.99
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source : Fuel Oil Division, Department of Commercial Registration, Ministry of Commerce.

Note : Jet was granted Articlr 6 license in July 1997

*: Jan-Jun

Table 5.10 Average Monthly Throughput per Station (Gasoline and HSD)

Unit : Litres per Month

	1992	1993	1994	1995	1996	1997*
PTT	295,862	235,617	216,549	237,212	227,471	294,674
Shell	324,524	285,851	301,162	299,034	275,569	262,218
Esso	336,846	288,081	297,539	291,547	306,540	310,122
Caltex	208,038	211,845	212,919	223,607	218,257	275,903
BCP	108,241	166,155	62,038	80,849	91,262	106,674
Total Majors	296,599	254,077	227,050	228,841	220,273	246,864
Susco	91,673	88,171	94,518	102,091	88,970	45,413
Cosmo	-	-	11,922	40,905	54,114	12,395
Mobil	112,627	140,887	183,006	189,301	251,763	191,944
Sukhothai	-	-	31,599	34,842	7,111	72,901
MP	-	-	-	538,365	421,972	661,189
BP	-	-	-	-	216,115	215,418
Q8	-	-	-	52,641	285,306	244,436
PT	-	-	1,943	3,190	41,079	101,200
TPI Oil	-	-	-	-	18,377	50,704
Total Independents	74,391	62,572	51,082	64,463	89,448	111,787
Total	284,186	240,409	209,034	195,141	187,591	211,111

- Based on Retail Stations Account, Department of Commercial Registration
- Article 6 Oil Companies Only

Note : Jet was granted Article 6 license in July 1997

* : Jan-Jun.

Caltex has also been doing quite well in terms of maintaining its station throughput despite continuously falling network share.

In 1992, the overall average monthly station throughput of all major companies was 254,511 liters. With the arrival of independent companies, the average throughput was falling steadily during 1993-1996 to reach 220,270 liters per month. This was a 25% fall in the throughput. However, the situation appears to be better at present as the throughput has been rising to about 246,800 liters.

As for independent companies, some of the throughput figures are questionable. Our opinion concerning the reported figures is as follows.

	1997 Average Monthly Throughput (liters)	Comment
Susco	45,413	Low
Cosmo	12,395	too low
Mobil	191,944	reasonable
Sukhothai	72,901	reasonable
MP	661,189	much too high
BP	215,418	reasonable
Q8	244,436	reasonable
PT	101,200	low
TPI	50,704	low

Susco's figure of 45,413 liters per month looks low although Susco's throughput per station has been found to be less than 100,000 liters in our other surveys. This is very true for Cosmo which has shown only 12,000 liters average throughput.

The figures for Mobil, Sukhothai, BP and Q8 are reasonable as they are consistent with our survey. The figure for MP is much too high since several MP stations found in the survey could sell only between 100,000 - 200,000 liters per month. On the other hand, the figures for PT and TPI are probably low.

5.2.4 Retail station survey

In this study, we have conducted a survey of 142 retail stations in five regions which are Bangkok, North, Northeast, Central and South. (see Table 5.11) The objective of the survey is to obtain detailed information concerning retail business such as sales volume, investment cost, profitability and competition. In addition, the

study would like to know the effects of the deregulation on retail business as seen by owners of retail stations.

Table 5.11 shows some basic information obtained from the survey. Average land area of the stations in this survey was 4 rais and the average number of fuel dispensers per station were 17. Forty two stations in the survey were in the city and 100 others were in suburb or on highways. As for brand distribution, 92 stations were major brands, 24 were foreign and independent brands, 4 were co-op stations and 12 were skid-tanks.

About half of the stations in this survey had convenience stores (C-stores) while 32% had restaurants. Two third of the stations had lube oil services and 38% had car wash services. These were all supplementary businesses which are getting to be very popular in the Thai retail oil industry.

86% of the stations opened 24 hour everyday. 32% of them were built during 1995-1997, and 31% were built during 1991-1994. Thus over 60% of the stations interviewed were built after the deregulation. However, 20% of the stations in the survey were over ten years old.

Seventeen percent of the stations interviewed had significant wholesale sales in addition to the normal retail business. These were normally large stations having their own oil tanker trucks.

Table 5.12 provides further detail of retail station distribution by oil company by year in operation. Since the survey was conducted in a fairly random manner, the number of oil brands represented in the survey were in line with actual retail station shares of these brands.

Table 5.11 Some Key Findings of Retail Station Survey

1. Number of station interviewed	:		142	
2. Regions surveyed	:	(BKK , N , NE , C , S)	5	regions
3. Average station size	:	Land area	4	rais
		No.of dispensers	17	
4. Location surveyed	:	City	42	stations
		Subburb/Highway	100	stations
5. Brand	:	Majors	92	stations
		Small foreign cos.	20	stations
		Thai independents cos.	14	stations
		Independent ststions and Co-ops	4	stations
		Skid-tanks	12	stations
6. % having service facility*	:	CV store	50.41	%
		Restaurant	32.39	%
		Car wash	38.17	%
		Lube change	63.38	%
		Tyre repair	26.76	%
		Truck stop	16.2	%
7. Operating hrs.	:	24 hrs.	86	%
		other	14	%
8. New Investment	:	1995 - 1997	32	%
		1991 - 1994	31	%
		1987 - 1990	17	%
		before 1987	20	%
9. % having significant wholesale sales	:		17	%

* : Including co-ops and skid-tank stations which do not usually have service facility like CV store, thus the percentage may be on the low side.

Table 5.12 Number of Stations Interviewed by Year in Operation

Number of Station

Brand	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	Before 1987	NO Answer	Total
BCP		3		4	1									8
BP									1		1			2
Caltex		1	2	4		1		1	1			5	2	17
Cosmo		1												1
Esso		1	3	3	3	1			1		1	8	2	23
JET		2	1	1										4
Mobil		2	1		1							1		5
MP				2										2
PA		1												1
PC Siam			1	1										2
PT				1									1	2
PTT	4		2	2	1	3			1		4	5		22
Q8	1		3	3			1		1				1	10
Shell	1	1	1	1	1	1	1	1		1	3	7	3	22
Susco													1	1
TPI	1	2	1											4
Others			1							1		1	1	4
Skid Tanks	1	3	1	1	2						1		3	12
Total	**8**	**17**	**17**	**23**	**9**	**6**	**2**	**2**	**5**	**2**	**10**	**27**	**14**	**142**
By Region														
BKK	2	5	4	7	2	1	1		1		2	8	4	37
C	2	3	5	5	1	1	1	1			1	3	2	25
N	1	4	2	4	3				2		6	7	1	30
NE	3	5	1	3	1					1	1	2	2	19
S			5	4	2	4		1	2	1		7	5	31
Total	**8**	**17**	**17**	**23**	**9**	**6**	**2**	**2**	**5**	**2**	**10**	**27**	**14**	**142**

Source : Retail Station Survey

Table 5.13 provides further detail of average station sizes. Average land areas of retail stations outside Bangkok were between 4 to 6 rais while the average area in Bangkok was about 3 rais. On the other hand, retail stations in Bangkok had higher number of fuel nozzles than the other regions. The average number of fuel nozzles in Bangkok were 24 compared to 15-17 in the other regions.

Table 5.14 shows average station workers per station. The workers include station boys and office staff. For small stations (less than 12 dispensers) average station workers were found to be 13 persons. For large stations (greater than 24 dispensers) average workers were 24 persons and were usually divided into 2 shifts of 12 hours each. Office workers usually worked day shift only. Skid tanks usually employed 2-3 workers.

Another interesting thing is that we have found average number of workers in Bangkok stations to be larger than that in the other regions for stations of the same

size. This is in contrast to our initial thought that workers are easier to find in up-country regions than in Bangkok, and are also less expensive to hire. However, we have found from the interview that good service is a key to be competitive in Bangkok area. Stations are also relatively busy and the number of dispensers are large. All of these require a relatively larger number of station boys compared to that in the other areas.

Table 5.15 presents a break down of retail stations by type of investment. As found in the survey, 36% of the stations were all invested by dealers. This means dealers owned the land and invested totally in building the station infrastructure. However, fuel dispensers usually belong to the parent company including sign boards. These equipment are usually leased to station owners.

At the other extreme, 49% of the stations interviewed were built entirely by oil companies. Again, this included land, station buildings and all of the equipment. The stations were then leased to operators or were run by the company staff. We have found that 36% of the stations were leased to operators while the rest were operated by the oil company staff. The different types of investment had a strong implication on the costs and profitability of retail stations as will be discussed below.

Table 5.13 Average Station Size

	BKK	C	N	NE	S	Total
Land area (rai)	3	4	5	6	4	4
Number of Dispensers						
Super	6	4	3	3	3	4
ULG	7	3	3	4	3	4
Reg	4	3	3	2	3	3
HSD	7	7	6	6	6	6
Total	**24**	**17**	**15**	**15**	**15**	**17**

Source : Retail Station Survey

Table 5.14 Average Station Workers Per Station

Number of Dispensers	BKK	C	N	NE	S	Total
1. less than 12	15	12	13	14	13	13
2. 12-24	22	19	19	19	22	20
3. greater than 24	28	21	0	0	24	24
4. Skid Tanks(1-2)	0	2	3	3	2	3

Source : Retail Station Survey

Table 5.15 Type of Investment by Region

	All Dealer Invested	Joint Investment	All Company Investment		No Answer	Total
			Company Operated	Leased to Operator		
BKK	9	6	3	18	1	37
C	7	1	5	12	-	25
N	10	5	3	11	1	30
NE	11	2	3	3	-	19
S	14	6	4	7	-	31
Total	51	20	18	51	2	142
%	36	14	13	36	1	100

Source : Retail Station Survey

As shown in Table 5.16, about half of Shell, Esso and Caltex stations were company invested, and almost all of them were leased to operators. On the other hand, only 13% of the PTT stations were company invested. Dealer invested stations accounted for 60% of the PTT stations compared to 20-25% of Shell, Caltex and Esso.

Joint investment stations are those where oil company and dealer share the costs of construction and land acquisition. We have found that 14% of the stations interviewed had this type of investment.

In the case of independent companies, Jet, BP and Susco stations were owned and operated by the companies. All other independents and Bangchak had all types of investment arrangements in their networks.

Table 5.17 shows a break down of services provided by retail stations in each region. These services could be summarized as follows.

- **restaurant.**Stations in Bangkok had the lowest percentage of restaurant service (10.8%) while the Northeast had the highest (63.1%). The average was 32.4%.

- **C-store.** Stations in Bangkok had the highest percentage of C- store (67.6%), followed by Central (60%). The North and Northeast regions had the lowest (36%). The average was 51%.

- **car wash.** 81% of retail stations in Bangkok had car wash service compared with the nation-wide average of 38%. On the other hand only 15.8% of stations in the Northeast had this type of service.

- **lube change.** 86.5% of stations in Bangkok had lube service compared to the nation-wide average of 63%. The percentages in other regions were also quite high showing that this type of service was profitable.

Table 5.16 Type of Investment by Company

Number of Station

Brand	All Dealer Invested	Joint Investment	All Company Company Operated	Investment Leased to Operator	No Answer	Total
PTT	13	4	1	2	1	21
Shell	6	4	1	12	-	23
ESSO	5	6	-	12	-	23
Caltex	3	5	-	8	1	17
BCP	4	-	4	-	-	8
Mobil	1	-	-	3	-	4
Q8	-	-	-	10	-	10
MP	-	-	1	2	-	3
BP	-	-	2	-	-	2
PT	1	-	1	-	-	2
Jet	-	-	4	-	-	4
Susco	-	-	1	-	-	1
Cosmo	-	-	-	1	-	1
PA	-	1	-	-	-	1
TPI	1	-	2	1	-	4
PC	1	-	1	-	-	2
Other	4	-	-	-	-	4
Skid Tanks	12	-	-	-	-	12
Total	**51**	**20**	**18**	**51**	**2**	**142**

Source : Retail Station Survey

Table 5.17 Type of Services Provided

	BKK		C		N		NE		S		Total	
	No.	% of Region	No.	% of Region	No.	% of Region	No.	% of Region	No.	% of Region	No.	% of Region
1. Restaurant	4	10.81	10	40.00	11	36.67	12	63.16	9	29.03	46	32.39
2. CV store	25	67.57	15	60.00	11	36.67	7	36.84	15	48.39	73	51.41
3. Snack stall	7	18.92	9	36.00	10	33.33	7	36.84	7	22.58	40	28.17
4. Car wash	30	81.08	7	28.00	6	20.00	3	15.79	8	25.81	54	38.03
5. Lube change	32	86.49	15	60.00	17	56.67	11	57.89	15	48.39	90	63.38
6. Tyre repair	12	32.43	11	44.00	4	13.33	8	42.11	3	9.68	38	26.76
7. Truck stop	1	2.70	9	36.00	5	16.67	5	26.32	3	9.68	23	16.20
Total Number of Stations	**37**	**100.00**	**25**	**100.00**	**30**	**100.00**	**19**	**100.00**	**31**	**100.00**	**142**	**100.00**

Source : Retail Station Survey

In the past, there were regulations requiring retail stations to construct lube change bays, but there is no such regulation now. Nonetheless, a large number of stations will continue to provide this type of service to customers.

- **truck stop.** Truck stop here is defined as a retail station having large land area and providing services especially to truckers and buses during rest stops. There were very few such stations in Bangkok area, but there several of them in Central and the Northeast.

As for the mode of oil supplies, 62.7% of stations interviewed owned no truck and have used oil delivery service of the oil companies. About 30% of the stations had their own oil trucks. Most of the stations in Bangkok fell under the first category. (see Table 5.18)

Table 5.19 shows the average monthly throughput per station from the survey. We have found that stations in Bangkok area had the highest throughput average of 386,000 liters per month, and the Northeast had the lowest at 257,000 liters per month. Stations in the North and South had about the same throughput of about 300,000 liters. Stations in Central were doing better with 325,000 liters per month.

The nation-wide average of all brands was at 309,400 liters per month. The figure is about the same as that of the data from the Commercial Registration Department for major brands, but is somewhat higher than the reported figures of the independents. As discussed above, we think the reported figures of some independents were probably distorted.

Table 5.18 Mode of Transportation

Number of Station

	BKK	C	N	NE	S	Total	%
1. Use Own Trucks	2	10	15	4	11	42	29.58
2. Company Delivery Service	35	15	13	10	16	89	62.68
3. Both	-	-	2	-	-	2	1.41
4. No Answer	-	-	-	5	4	9	6.34
Total	37	25	30	19	31	142	100.00

Source : Retail Station Survey

Table 5.19 Average Monthly Throughput per Station

Unit : litres

	BKK	C	N	NE	S	Total
Volume (Litres)	386,000	325,000	297,000	257,000	300,000	309,400
Number of Stations Interviewed by Brand						
PTT	3	3	8	1	6	21
Shell	5	3	9	1	5	23
ESSO	9	5	1	-	8	23
Caltex	7	2	3	-	5	17
BCP	5	2	-	1	-	8
Mobil	3	-	-	1	-	4
Q8	4	4	1	1	-	10
MP	-	-	1	1	1	3
BP	1	1	-	-	-	2
PT	-	-	-	1	1	2
Jet	-	2	1	1	-	4
Susco	-	-	1	-	-	1
Cosmo	-	-	-	1	-	1
PA	-	-	-	1	-	1
TPI	-	1	1	2	-	4
PC	-	-	-	-	2	2
Other	-	-	-	3	1	4
Skid Tanks	-	2	4	4	2	12
Total	37	25	30	19	31	142

Source : Retail Station Survey

5.3 Retail Industry Conduct

At the time of the oil price deregulation in 1991, retail oil market in Thailand was clearly an oligopoly as 98% of retail gasoline and HSD volumes were in the hand of four major oil companies namely PTT, Shell, Esso and Caltex. Although Shell might be relatively strong in retail gasoline sales and PTT in HSD, there was no clear dominant firm in the industry. The main characteristics of the retail oil industry at the time of the oil price deregulation were as follows.

- The market was an oligopoly with no clear dominant firm. Market shares of the top three companies namely PTT, Shell and Esso were not significantly different from each other.
- There was no open price competition in retail sales, particularly among the major companies. Most of retail stations carrying major brands were selling at the controlled retail prices. Thus all stations in the same area were selling at the same price for the same oil product. As such there was no ' price leader ' in the retail industry.
- Price differential between actual retail and controlled prices could exist in some remote areas. However, the tendency was for the actual retail prices to exceed controlled prices. This was particularly true at drum-pump outlets which were the most common form of rural fuel service.
- There was no evidence of 'collusion' among these major oil companies. In fact, these companies were known to closely observe the movements of their market shares and would fiercely defend the shares from competitors.
- Competition usually took the form of non-price strategy. They all realized that an effective way to protect and to defend the market share was to build up the base of 'regular' customers. This was done mainly through various non-price strategies such as heavy advertising campaigns, fuel quality improvements, free gifts to retail customers, good station services and others.
- There was no legal barrier to entry into retail business. Thai laws allowed any individual to build a service station carrying its own logo provided that the station could meet all the safety standards established by the government. However, the number of independent stations were small at that time.

5.3.1 Entry into the retail industry

As discussed earlier, before the time of the oil price deregulation, the four major oil companies had been in control of the retail oil industry in Thailand as they had combined market shares of over 89% of retail oil volume as well as the retail station network. Most independent companies including Bangchak at that time were engaging mainly in wholesale sales and were only looking for the right opportunity to step into the retail area. The question was were there any barriers to entry that would hinder the other non-major oil companies to engage in retail sales?

One of the answers was obviously that the level of controlled retail margins were small and were infrequently adjusted. Although the poor retail margins would also adversely affect the existing networks, but they would affect more strongly on new investments. New comers needed to build not only retail stations, but also oil storage facilities and distribution systems which would require significant amount of new investments. On the other hand, the existing oil companies already had retail networks and efficient distribution systems in place for a very long time and would require relatively small amount of new investments for the network expansion or modernization.

Secondly, for PTT, Shell, Esso and Caltex, being the well established oil traders for a long time certainly was an effective barrier to entry. New comers would find it difficult to win customers from the majors on the basis of oil product quality, services or widespread availability of the network. These were the things that would take time to develop. A more quick marketing tool was to cut the retail selling prices and margins to attract certain groups of customers. However, to be effective, the level of price cutting had to be meaningful and other competitors must not lower their prices to match. Under the controlled margin situation, it would be difficult to do such that. This was particularly true for new investors who had to shoulder the heavy investment burdens in starting up the network.

Thirdly, an ability to find steady supplies of oil at competitive prices particularly from domestic sources was important for the long term profitable operations of the network. Supplies and prices from local refineries were relatively more stable compared to the imported sources, especially for relatively small traders. However, supplies from local refineries were all in the hands of major oil companies. The major oil companies also had an advantage of being able to secure the supplies both from domestic and imported sources. Non-Article 6 companies would have only one supply option which was to buy from other Article 6 companies.

Fourthly, certain safety regulations also acted as a barrier to entry as they required retail stations to be quite large in terms of land area. The stations had to be built on large streets which had high land costs, and had to have certain consumer service facilities like lube bays and car wash. These requirements were all translated to high costs of retail investment and would affect new networks more strongly than the older ones because of the rapidly rising land and construction costs.

Government planners were well aware of these barriers and had made the changes to minimize these barriers in order to stimulate entries into retail market. They knew that competition was one of the key factors in the successful implementation of the oil price deregulation policy. Safety regulations were revised to allow construction of smaller retail stations which could be located on smaller streets. Stations could also do without certain service facilities and could have much more flexibility in designing station layout. Regulations concerning Article 6 oil traders license were liberalized to allow free entries of qualified companies. Oil importation procedures were also revised to allow free imports by qualified companies.

After finishing the 'preparation' stage, oil pricing was deregulated. That is the level of the margins and transport charges were decontrolled. The detail of this is shown elsewhere in this paper. Before the deregulation, only five Article 6 companies were engaged in retail sales by having their own retail station networks. These oil companies were PTT, Shell, Esso, Caltex and Mobil. There were also a few hundred stations belonging to non-Article 6 independent operators.

In 1991, four companies entered retail sales which were Bangchak, Susco, BP and Q8. They all started out with a small network of retail stations. Bangchak, Susco and Q8 initially focused their network in up-country areas. On the other hand, BP built their stations mainly in Bangkok area and surrounding cities.

In 1993, Cosmo and PT opened their first retail stations which were built entirely in up-country regions. Jet also introduced its first stations in Thailand in 1993 with a clear objective of building modern city stations.

In 1994, Sukhothai, a small Thai independent, opened its small retail station network. In 1995, three relatively well financed companies entered the race. These were MP, a retailing arm of Chalern Mankong oil importing company, TPI and Petro Asia (PA). There were also a large number of non-Article 6 stations being built during the period as discussed earlier. There has been no new entry of a major retail network since 1996.

Apparently, a large influx of oil companies entering retail sales since 1991 could be attributed partly to the oil price deregulation and the changes in other related regulations as discussed above. The other important contributing factor to a large number of entries has been from a strong growth in gasoline and HSD demand in Thailand since the deregulation. Retail oil demand grew at 6.7% per year during 1992-1996 which had made entries much easier compared to the situation where the market growth was stagnant. Although the existing networks were trying to do their best to protect their market shares from eroding, new comers could find their places in the market under such situation.

Competition in retail sales has been more intense after the deregulation since the oil companies now have to compete on price in addition to the non-price factors that they had been used to before the deregulation.

Another factor that may be related to the flourishing of retail business after the deregulation was the booming of smuggled diesel oil. HSD were smuggled into Thailand from neighboring countries; particularly Singapore, to take advantage of significant tax differential between Thailand and these countries. Although it is difficult to determine the exact nature of this illegal business, it was generally agreed that HSD had been smuggled into Thailand many years ago but the activities appeared to 'peak' between 1992 to 1994 when the estimated volume of between 1-2 billion litres of HSD were smuggled into the country each year.

The smuggled oil volume appeared to be falling to levels below 1 billion litres per year during 1995-1996, but several major oil companies disagreed with such assessment.

Nevertheless, it is obvious that the smuggled diesel oil have found its ways to retail consumers. The prime 'suspects' of distribution channels have been small retail outlets in the forms of skid-tanks, small rural stations, drum-pumps, marine stations and even some formal retail stations of the well known brands. Certain independent Article 6 companies are said to be behind the smuggled oil business, but the evidence of their involvement have yet to be revealed. In the mean time, several areas of the country have been flooded with supplies of inexpensive oil which have induced intense local price competition especially between small retail outlets. However, the major stations have adopted other forms of price competition which is discussed below.

Table 5.20 Year Article 6 Oil Companies Entering Retail Business

	1990 or Before	1991	1992	1993	1994	1995	1996	1997
1. Major								
PTT	✓							
SHELL	✓							
ESSO	✓							
CALTEX	✓							
BCP		✓						
Article 6								
2. Independent								
SUSCO		✓						
COSMO				✓				
MOBIL	✓							
SUKHOTHAI					✓			
MP						✓		
BP		✓						
Q8		✓						
PT				✓				
TPI						✓		
3. Non- Article 6								
JET				✓				
PA						✓		
Others	✓							
New Company Entries		**4**	**-**	**3**	**1**	**3**	**-**	**-**

Source : Fuel Oil Division, Department of Commercial Registration, Ministry of Commerce.

5.3.2 Retail price competition

When retail oil pricing was deregulated in 1991, questions probably came up in the minds of oil companies' managers like at what level should we set the pump prices, how would our competitors behave, should we try to differentiate our prices, who would take the lead in price settings...etc. Apparently, there was a brief period of uncertainty what competitors would do and every oil company adopted its 'usual' pricing procedure by building up retail prices from the summation of ex-refinery and imported prices plus taxes plus regulated transport changes plus the "adjusted" margins.

a) Period immediately after the deregulation

As shown in Table 5.21, the average marketing margins went up by over 10 satang per litre in the month following the deregulation of retail prices in May 1991. In July, the margins for gasoline went up further by about 8-9 satang per litre while the margins for HSD were stabilized at the June level. In the following months during the second half of 1991, gasoline margins continued to rise gradually and steadily to reach 94 satang, 88 satang and 81 satang per litre for premium, ULG, and regular gasoline, respectively. Thus, during the six month period after the deregulation the average margins went up by about 30 satang per litre for premium and ULG and 21 satang per litre for regular gasoline compared to the controlled margins prior to the deregulation.

As for HSD, the level of margins were swinging up and down because of the force of competition and stayed at 74 satang per litre at the end of 1991. The margins thus went up by about 25 satang per litre during the period.

About 5 satang per litre increase in the margin was to compensate oil companies for additional oil reserve requirement expenses imposed by the government. The rest of the increase was to compensate the oil companies for the long overdue adjustment of the margins.

The level of margins obtained by each oil company were different from the average margins shown in Table 5.21. This depended on how each of the oil companies priced its oil products relative to the competitors.

Not very long after the deregulation, the 'pricing position' of each of the oil companies became clear. By the end of December 1991, retail prices in Bangkok of the oil companies were as follows.

Table 5.21 Average Marketing Margins

Unit : Satang/Litre

	Gasoline			HSD
	Premium	ULG	Regular (87-92 RON)	
1991				
Before Deregulation	62.20	62.20	60.00	48.58
After Deregulation				
June	72.77	72.77	63.94	62.88
July	81.43	81.43	73.45	62.44
August	79.79	79.79	74.26	57.40
September	88.67	88.67	79.91	52.82
October	88.80	88.80	74.64	63.34
November	91.88	91.88	75.84	58.19
December	94.43	94.43	80.73	73.70
Annual Average				
1992	85.75	85.75	85.50	76.45
1993	117.62	117.62	94.19	89.57
1994	117.29	125.57	108.03	95.08
1995	137.27	162.25	126.77	103.99
1996	159.18	150.27	145.46	92.71
1997 (Jan-Nov)	160.07	152.12	161.78	111.91

Source : National Energy Policy Office (NEPO)

December 1991 Bangkok retail prices (baht / litre)

	Premium	ULG	Regular(83)	HSD
PTT	9.47	9.12	8.87	8.04
Shell	9.55	9.15	8.92	8.12
Esso	9.52	9.15	8.91	8.07
Caltex	9.50	9.15	8.90	8.07
Mobil	9.52	9.15	8.92	8.10
BP	9.55	9.29	8.90	8.12
Q8	9.52	9.16	8.90	8.07

Source : NEPO

Shell established itself as a 'high price' company by pricing its fuel products 3-5 satang per litre higher than the competitors like Esso and Caltex. Apparently, Shell was using product differentiation tactic by providing a signal to consumers that its product and service qualities were superior to that of the competitors and hence the high prices.

On the other hand, PTT, as a state oil agency, was instructed by the government to establish the pricing "standard" for the industry. PTT was asked to charge only 'fair' margins and this effort was well publicized. In other words, the government tried to retain some power to manage the oil prices through PTT. In practice, PTT prices were about 5 satang per litre below that of the oil majors like Esso and Caltex. In effect, the price differential between PTT and Shell were as much as 10 satang per litre.

Independent companies at that time priced their products at the same level as Esso and Caltex and some, like BP, at the same level as Shell.

The other important point is that virtually every oil company tightly controlled oil pricing and the margins of all retail stations in its network. Each retail station in the network was instructed by fax or telephone, normally on a weekly basis, from the oil company regional office how to set the prices at the station. Prices in the provinces were Bangkok prices plus standard transport charges which were quite similar between the oil companies. Thus the relative price differential between oil companies in Bangkok would roughly be the same in the other provinces. As far as the retail stations owners were concerned, the pump prices and their margins were continued to be controlled. The differences from the past practice were that the prices were changed much more often than before and might not be the same as that of the nearby stations of different brands. Their margins were also initially improved. Thus price competition was really a matter of corporate policy and in most cases dealers did not have any direct input in the pricing of the products at their pumps.

However, it was retail dealers who had to face the impact of price competition. Dealers of relatively high price stations had often found it somewhat harder to sell the oil as the oil prices had to be clearly displayed in front of the stations. Furthermore, dealers' margins were determined by sales volume not the pump prices.

b) Two years after the deregulation

About two years after the deregulation, a few changes had taken place that had direct impact on the pricing of the oil. The relative prices of oil companies in November 1993 were as follows.

November 1993 Bangkok retail prices (baht / litre)

	Premium	ULG	Regular	HSD
PTT	8.93	8.58	8.31	7.82
Shell	9.03	8.80	8.41	7.87
Esso	9.03	8.78	8.28	7.87
Caltex	9.03	8.79	8.29	7.88
BCP	8.92	8.58	8.26	7.78
Mobil	9.04	8.80	8.31	7.88
BP	9.04	8.79	8.32	7.88
Q8	8.94	8.03	8.33	7.82
Susco	8.97	-	8.30	7.87

Source : NEPO

Firstly, there were more entries of independent companies into retail industry. Bangchak, a state owned oil refiner, had become an established retail oil company and had made it clear that it would be the marketer of high quality oil products having low prices. In fact, Bangchak priced the oil products at 3-4 satang per litre lower than that of PTT's. However, there were some Bangchak stations that were selling at significantly lower prices than that of the company's established prices in order to gain entry. That marked the beginning of local price competition between formal stations.

Secondly, with the influx of smuggled oil, informal retail stations had begun to flourish. Skid-tank pumps which had been previously seen in rural areas began to show up along main roads. Their prices were significantly lower than the prices of the major brands. In some cases, the prices were lower than product acquisition costs of the major oil companies thus confirming their believe of the existence of smuggled oil.

Thirdly, average marketing margins of the oil companies had continued to rise. The margins of premium gasoline went up from 94 satang per litre in December 1991 to 139 satang per litre in 1993. HSD margins also went up by 29 satang per litre during the period. (see Table 5.21). Stronger margins had attracted higher new investments and had put more pressure on the retail competition.

However, Shell, Esso and Caltex did not try to match Bangchak's or PTT's prices. Shell gave up its high price strategy and was selling at about the same prices as that of Esso and Caltex. Independent companies were also selling at about the same prices as the major brands except for Q8 and Susco who were following PTT's prices. Thus the price spread between the lowest price company (Bangchak) and the highest price company (like Shell) was about 10 satang per litre.

Although the price gaps between the formal and informal stations were very large, none of the formal stations would try to lower the prices to compete with the informal stations. As mentioned above, retail pricing was a corporate policy matter and most companies saw no point of starting the price war with the informal stations, even on a local basis.

In any case, consumer demand for oil products was strong and the retail margins were relatively attractive. These were the right ingredients that attracted huge influx of new retail investments in the years to come.

c) Present situation

Six years after the deregulation, the ways oil companies priced their oil products at the pumps have become much clearer. The industry appears to be divided into four groups of retailers, each having different pricing behavior as follows.

The first group consists of the five major oil companies which are PTT, Shell, Bangchak, Esso and Caltex. This group has become a cohesive group in terms of retail pricing. Pump prices of these companies in the same location have been remarkably similar. Although there are some occasions that Bangchak prices are lower than the other majors, the price differential are narrow, in the range of a few satang per litre, compared to the previous gap of over ten satang per litre.

It is unclear whether Shell, Esso and Caltex have lowered their prices to match that of PTT and Bangchak or the latter two companies have raised their prices to be in line with the former companies. However, in the end the major companies have decided not to compete with each other in terms of price cutting. They have probably realized that price cutting would not lead to volume gains but certainly would lead to significant revenue losses.

However, retail price cutting by major stations do exist on a local area basis. Our field survey results as shown in Table 5.22 to Table 5.26 have revealed price differential between major stations in the same area. For example, HSD prices in Phitsanulok in

February 1997 were 8.77 baht per litre at Shell stations, 8.35 baht at PTT(1) station, 8.75 baht at PTT(2) station, and 8.60 baht per litre at Caltex(2). (see Table5.22) Price differential in this case was in response to a price war sparked by a retail station in that area. In this case it was Jet who cut the price of HSD to 8.55 baht per litre compared to the 'usual' price of about 8.75 baht per litre.

Table 5.22 Range of Retail Prices in the North, Date : 20-21 February 1997

Unit : Baht/Litre

	Regular	Premium	ULG	HSD
Shell (1)	9.47	9.97	9.86	8.77
Caltex (1)	9.45	9.95	9.85	8.75
PTT (1)	9.45	9.88	9.85	8.35
Bang Chak (Co-op)	-	-	-	8.85
Jet	9.29	9.79	9.69	8.55
Caltex (2)	9.20	9.70	9.60	8.60
Shell (2)	9.47	9.97	9.86	8.77
PTT (2)	9.45	9.95	9.85	8.75
Susco	9.45	-	9.85	8.75
Cosmo	9.47	9.90	9.80	8.55
PTT (Bangkok)	9.35	9.85	9.75	8.65

Source : Field Survey in Phitsanulok Area

Table 5.23 Range of Retail Prices in the Northeast, Date : 7 June 1997

Unit : Baht/Litre

	Regular	Premium	ULG	HSD
Cosmo	9.25	9.69	9.58	8.75
PTT	9.20	9.66	9.58	8.68
Bang Chak	9.23	9.69	9.61	8.67
Skid Tank (1)	-	-	-	8.09
Skid Tank (2)	-	-	-	8.00
Skid Tank (3)	-	-	-	8.29
MP	9.25	9.66	9.58	8.70
PT	8.90	9.39	9.30	8.49
TPI	8.69	9.15	9.07	8.12
Q8	9.19	9.63	9.59	8.44
Jet	8.99	9.30	9.19	8.35
PTT (Bangkok)	9.19	9.61	9.53	8.68

Source : Field Survey in Korat Area

Table 5.24 Range of Retail Prices in the South, Date : 1-2 March 1997

Unit : Baht/Litre

	Regular	Premium	ULG	HSD
Independent	8.97	-	9.88	8.56
Esso (1)	9.43	9.93	9.83	8.74
Esso (2)	8.95	9.99	9.89	8.55
PTT	9.42	9.93	9.83	8.74
Shell	9.43	9.93	9.82	8.70
Caltex (1)	9.43	9.93	9.83	8.69
PC Siam (1)	9.15	-	-	8.50
PC Siam (2)	9.34	9.89	9.83	8.67
Drum Pump	9.50	10.00	-	8.50
PTT (Bangkok)	9.35	9.85	9.75	8.65

Source : Field Survey in Surathani Area

Table 5.25 Range of Retail Prices in the Central, Date : 16 February 1997

Unit : Baht/Litre

	Regular	Premium	ULG	HSD
Jet (1)	8.95	9.39	9.35	8.49
Esso	9.36	9.86	9.75	8.66
Q8 (1)	9.19	9.65	9.59	8.49
Shell (1)	9.36	9.86	9.75	8.66
PTT	9.35	9.85	9.75	8.65
Jet (2)	9.05	9.55	9.45	8.49
Q8 (2)	9.39	9.78	9.69	8.74
Shell (2)	9.36	9.86	9.75	8.66
BP	9.21	9.71	9.60	8.66
Bang Chak	9.33	9.78	9.73	8.64
PTT (Bangkok)	9.35	9.85	9.75	8.65

Source : Field Survey in Saraburi Area

Table 5.26 Range of Retail Prices in the Bangkok Area, Date : 22 June 1997

Unit : Baht/Litre

	Regular	Premium	ULG	HSD
Jet	-	9.49	8.99	8.09
Esso (1)	-	9.51	8.99	8.09
Bang Chak	-	9.49	8.99	8.09
Q8	9.05	9.49	9.29	8.24
Esso (2)	9.05	9.51	9.39	8.43
Caltex	9.05	9.51	9.39	8.49
Mobil	9.05	9.51	9.29	8.53
Shell	9.05	9.56	9.29	8.53
PTT (Bangkok)	9.20	9.66	9.58	8.45

Source : Field Survey in Sukhaphiban 3 Area

Under such situation, the oil companies would review the seriousness of the competition and the effects on the local network. Normally, it was the local dealers who first felt the impact of volume loss resulting from the strong price cutting by Jet and asked the oil companies for assistance. If the oil companies agree to help, dealers would then be allowed to lower the prices to compete with Jet prices. However, both the oil companies and dealers must share the 'cost' of price cutting which were the reduction in the marketing margins. In general about 70% of the reduced margins were absorbed by oil companies and 30% by dealers.

Since dealers must help share the costs of price cutting, some dealers may choose not to cut the prices because that will eat into their own margins. This is one of the reasons why two PTT stations in nearby area were selling at different prices for HSD. Shell stations initially had tried to match the Jet prices but later gave up and were selling at Shell's normal prices.

Similar situation could be found in many other areas where there are stations like Jet or other independents on even some major stations cutting the prices.

Price cutting at a station may be across the board or only for certain products and are normally not on extended period of time. In the end, it is the relative strength of local dealers that will determine the extent of a local price war and how the fight will prolong in a normally no win situation. However, it is the consumers who will benefit from such engagement.

The second group of oil companies are long established independents like BP, Susco, Q8, and Mobil. Our survey have found that BP and Susco, being all company owned and operated stations, have been selling at about the same prices as that of the major brands. On the other hand Q8 and Mobil have significant dealer operated networks and their dealers have stronger flexibility in setting their own pump prices as the companies only providing pricing guidelines to the dealers not a rigid price level orders as in the case of major oil companies. In general, their pump prices are lower than the major companies' prices.

The third group of companies are newly entered independents like Jet, Cosmo, TPI, MP and PA. Jet stations are all company owned and operated while the rest of the companies are mainly dealer operated networks. However, these are the companies that have been found to use price cutting as the main strategy to gain foothold in the retail industry. This is particularly true for Jet which has cut prices at their new stations to gain consumers attention and the business. The idea is to attract consumers to visit the station by mean of low oil prices and then to impress them with services, so the customers hopefully would come back again for business. As said above, Jet's strategy had started local price wars as other nearby retail stations fought back forcing Jet to lower the pump prices even further to incredibly low prices in some locations. These were true price wars as prices were sometime changed several times a day in those locations. Although the wars appear to be less intense now, Jet has continued to price their products at significantly lower level than the normal pump prices.

TPI, PT and MP have followed Jet's strategy by lowering their pump prices significantly using the networks of company owned and operated stations. However, for dealer operated stations, the prices tend to be in line with the other independent oil companies. (see Table 5.23)

The final group of companies are the informal retail stations. These are mainly skid-tank pumps selling only HSD. Included in this group are also independently owned stations using their own logos. These pumps have been in business even before the deregulation, but their numbers have flourished since the prices were floated. Official statistics show that there are over 3,000 of such pumps at present but the actual number could be somewhat higher as there are a large number of unregistered pumps in operation. In terms of pricing, the selling prices are normally much lower than the formal station prices. According to Table 5.23, skid-tank prices in one Korat area varied between 8-8.29 baht per litre in June 1997 compared to Jet price of 8.35 baht and PTT price of 8.68 baht per litre of HSD. Although skid-tank prices probably have no direct effect on product pricing at formal retail stations in the same area, they are inevitably competing for HSD

volume despite the claim that the two types of stations are serving different groups of consumers.

In our field survey, we also asked the opinions of retail station operators how they felt about the company established price level in their stations. Of the 117 station owners who responded, 53% said they were satisfied with the given level of pricing while 11% said they were dissatisfied. (see Table 5.27) The reasons for not being satisfied were mainly because the prices were too high or the prices were changed too often. There were 18% the respondents who could not provide the answer.

5.3.3 Non-price competition

Non-price competition here includes all forms of retail competition other than direct price cutting at the pumps. Common forms of non-price competition found in the Thai retail market are as follows.

Free gifts : Retail stations in Thailand customarily provide gifts to customers who buy fuels of at least 250 to 300 baht in a single visit. The gifts could be anything but could be classified into various grades. Grade A gifts are things like a box of tissue paper, a bottle of drinking water, a carton of milk, and a drinking glass. These are popular gifts among urban customers driving sedan cars. Grade B gifts are things like a can of coffee drink or caffeinated drinks, a pack of ice cubes and a wash towel. These are gifts for drivers of trucks and pick-ups.

Free give-away of gifts is one of the most common forms of non-price competition. In certain areas, customers are even expecting to receive something from the stations and a station must provide free gifts just to remain at par with the other nearby stations. Free gifts are sometime financed by oil companies during promotion campaigns but most of the time station owners must pay for the gifts from their own accounts. The cost of the gifts is about 1% of fuel sales revenue according to our field survey.

Services : Providing customers with good services is another way to attract customers. This includes good forecourt services, cleanliness of restrooms and station area and others.

Table 5.27 Opinion Concerning Suitability of Company Established Price Level

Number of Stations

Brand/Region	S			NE			N			C			BKK			Total
	Yes	No	No Answer	Yes	No	No Answer	Yes	No	No Answer	Yes	No	No Answer	Yes	No	No Answer	
BCP				1						2			3		2	8
BP										1				1		2
Caltex	3		2				2	1		2			4	1	2	17
Esso	6		2					1		4		1	6		3	23
Jet				1					1		1	1				4
Mobil						1							1	1	1	4
PTT	5		1	1			4	1	3	3			1		2	21
Q8				1			1			2	1	1	3	1		10
Shell	3	1	1		1		8	1			3		4	1		23
Susco							1									1
TPI						2	1			1						4
Total	**17**	**1**	**6**	**4**	**1**	**3**	**17**	**4**	**4**	**15**	**5**	**3**	**22**	**5**	**10**	**117**

Improvement of oil product quality. This is in fact a strong selling point of major oil companies who have been trying to differentiate their products from the others.

Complete services. It is getting to be quite popular for retail stations to add non-oil businesses in their customer service options. It is now common to find convenience stores, restaurants and other non-oil services in retail stations and customers appear to like the idea. This is also the way to generate station incomes to supplement oil revenues.

Credit. Credit is an important tool to gain the business of large customers like fleet owners. However, it also increases business risks if the station owners are not careful about giving out credits. It also increases the cost of the stations in terms of interest charge as most stations must pay cash for the supplies of oil to their stations.

We have also asked the station owners in our field survey to provide their opinions concerning the effectiveness of various sales promotions in gaining the business of retail customers. Firstly, 42% of the station owners responded said price cutting was not an effective way while 58% said price cutting was either most effective or effective. (see Table 5.28) As for free gifts, 91% of the station owners said the method was most effective or effective in gaining customers while only 9% said no. On services, 94% of station owners said the method was most effective or effective while only 6% said no. Thus, most station owners interviewed appeared to agree strongly that free giveaways and good services were very important methods in winning retail customers even more so than price cutting. We also noted that skid-tank pumps also compete on station services in addition to having low prices. Customers were normally provided with a glass of water or iced coffee regardless of the amount of purchase.

From our observation, non-price competition have become stronger after the deregulation of retail oil prices. This is consistent with the overall increase in business competition of the retail oil industry as more players have entered the industry, induced by the effect of the oil price deregulation.

Table 5.28 Effectiveness of Sales Promotion by type of Promotion

Number of Stations

	Most Effective		Effective		Not Effective		Total
	No.	%	No.	%	No.	%	
1. Price Cutting							
BKK	19	58	9	27	5	15	33
C	6	25	8	33	10	42	24
N	10	38	7	27	9	35	26
NE	6	67	2	22	1	11	9
S	5	20	5	20	15	60	25
Total	27	32	22	26	35	42	84
2. Free Gifts							
BKK	16	47	18	53	0	0	34
C	12	55	8	36	2	9	22
N	13	46	14	50	1	4	28
NE	4	33	7	58	1	8	12
S	12	41	12	41	5	17	29
Total	57	46	59	47	9	7	125
3. Others (Services)							
BKK	6	20	24	80	0	0	30
C	9	43	11	52	1	5	21
N	8	38	10	48	3	14	21
NE	4	33	7	58	1	8	12
S	13	59	8	36	1	5	22
Total	34	45	36	47	6	8	76

5.4 Retail Industry Performance

5.4.1 Retail station margins

The objective of this section is to analyze the effect of oil price deregulation on profitability of retail industry. The focus of the analysis will be on retail station business. Profitability of a retail station depends on many factors, but the significant ones are investment level, margins received, sales volume, station expenditures, and other non-oil incomes.

a) investment level There are three significant parts of retail investment costs which are construction costs, land costs and stock costs. Firstly, the construction costs depend on the size of a retail station. The station size could be classified into three types as shown in Table 5.29. Small stations are defined here as that having land area between 1-2 rais and have fuel nozzles of about 10-12 units. These are typical small station designs. This size of station would cost about 5 million baht to build. Additional costs of about 1-1.5 million baht are for fuel nozzles systems. Finally, if the station has a standard size C-store, the construction of the store plus equipment would cost about 1 million baht. The total construction and equipment costs of a small retail station are 7-7.5 million baht. For a medium-size station, the costs will rise to 14-15 million baht. And for a large-size station having 35-40 nozzles the cost will be about 20-21 million baht.

Secondly, land cost is a very expensive part of retail investment. However, land prices vary widely depending on the location of the land. The cost would be as low as a few hundred baht per rai in a remote area to over a hundred million baht per rai in prime locations in a major city. Thus, in order to build a station on a prime location where land price is very expensive, investor usually leases the land on a long term basis instead of buying that piece of land. In such case, landowner usually demands up front cash payment and then monthly lease payments. The longer the lease period, the higher the sum of the advanced payment.

Table 5.29 Retail Station Construction Costs by Station Size

(Costs in Million Baht)

	Small	Medium	Large
Land area (rais)	1-2	3-4	5 +
Number of Dispensers	10-12	20-24	35-40
Construction costs	5	11	14-15
Fuel dispenser costs	1-1.5	2-3	5
C-store costs	1	1	1
Total costs	7-7.5	14-15	20-21

Exclude land cost, fuel stock cost and c-store stock cost, fees and other expenses.

Source : field survey (conducted during first half of 1997)

Thirdly, the stock costs consist of the fuel stock costs and C-store stock costs. An initial fuel stock of 30,000 litres (one full tanker) would cost in excess of 300,000 baht. Stock up a standard size C-store would cost another 100,000 baht.

b) retail station margins. For most stations, retail station revenues depend on the level of margins not selling prices. The marketing margins that one has often heard like that shown in Table 5.21, are "gross" margins. These are the margins that have to be allocated or split between an oil company and its retail dealers.

The division of the gross margins is a private matter between the oil company and each of its retail dealers. Each dealer has its own account and the margins received could be different from the other dealers in the same retail network. The differences in dealers' margins are the result of many factors but the most important one seems to be the amount of investment a dealer is sharing with the oil company in building a retail station. Obviously, if a dealer invested in everything such as land and station construction, he must receive relatively higher margins compared to the other extreme case where the oil company completely established that station and leased the station to the dealer to operate. There are also cases in between the two extremes where the dealer and oil company jointly invested in building that station and the number of ways to join the investments are numerous. In the end, the amount of the dealer investment is the key to the establishment of dealer's margins. Other factors like expected sales volume, level of competition in the area, bargaining power of the dealer etc. play important roles in the margin negotiations between the oil company and the dealer.

Although it is difficult to find a unique margin figure for each type of dealer, we have been able to establish a range of dealer margins from our filed survey. As shown in Table 5.30, dealer invested stations (normally excluding fuel dispensing equipment) may receive margins before VAT of between 35-40 satang per litre for HSD and 45-50 satang per litre for gasoline. At the other extreme, dealers of company invested stations may receive a margin of about 30 satang per litre for HSD and 35 satang per litre for gasoline. For those dealers who jointly invested in retail stations with the oil company may receive higher margins than the leased stations. The range is probably between 30-35 satang for HSD and 40-45 satang for gasoline.

Table 5.30 Range of Dealers Margins by Type of Investment : February 1997

Unit : Satang/Litres

	Before Deregulation	Retail Station Margin**		
		Dealer invested	Company Operated	Joint Investment
- **Gasoline**	25-35	40-50	35	40-45
- **HSD**	20-25	35-40	30	30-35

Source: Field Survey

**For base target volumes only, volume above base targets will receive higher margins

The level of dealer margins shown are for base target volume. Sales volume that exceed the base target volume will receive higher margins.

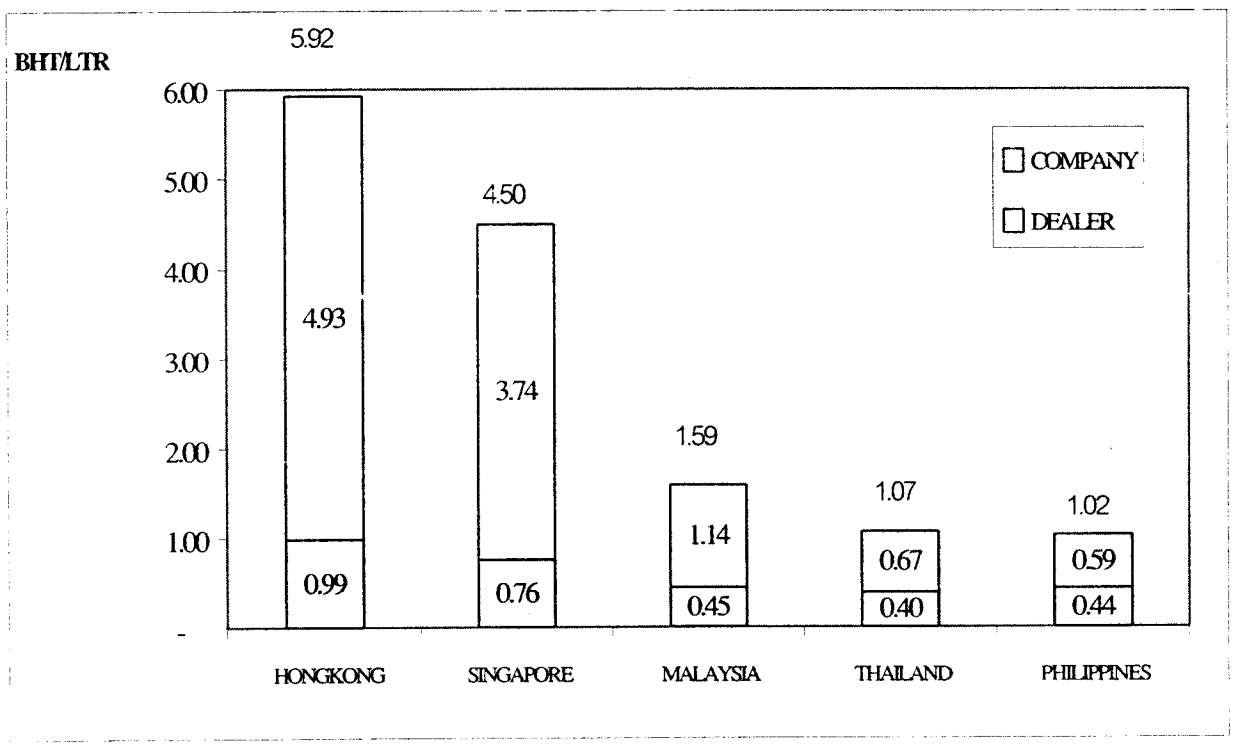
The present level of dealer margins have been higher compared to that received before the oil price deregulation. As shown in Table 5.30, average dealer margins before the deregulation were about 20-25 satang per litre for HSD and 25-35 satang per litre for gasoline. It is also clear that the shares of dealer margins have been less than half of the total gross marketing margins. As shown in the table, dealer shares have been approximately 30%-40% of the total margins while oil companies have earned the rest.

It is also interesting to note that, despite the deregulation of marketing margin since 1991, the levely the margin in Thailand is still relatively low compared to some other countries in the regions. As shown in Figure 5.5, the average marketing margin in Thailand for motor fuels in 1995 was 1.07 baht per litre, according to an oil company source. The level of the margin was about the same as that of the Philippines which was 1.02 bath per litre. However, the 1.07 baht per litre margin in Thailand was low compared to 1.59 baht per litre in Malaysia, 4.5 baht per litre in Singapore and 5.92 baht per litre in Hongkong. (see below). These were the gross margins which had to be divided between oil companies and retail dealers. In addition, the margins in Thailand also include the costs of fuel quality improvement in order to meet various government environmental standards as well as those incurred as a result of government measures including traffic regulation on truck operating hours.

1995 Average Motor Fuel margins (Baht/litre)

	Oil company	Dealer	Total
Thailand	0.6	0.4	1.07
Philippines	0.59	0.44	1.02
Malaysia	1.14	0.45	1.59
Singapore	3.34	0.76	4.5
Hongkong	4.93	0.99	5.92

Figure 5.5 Average Motor Fuels Margins



As for the margin split, dealers of an oil company in Thailand received 37.3% share of the gross margin on average while those in the Philippines received 43.1%. On the other hand, dealers in Malaysia, Singapore and Hongkong received only 28% , 16.9% and 16.7% shares, respectively. Thus, relatively speaking, dealers in Thailand appeared to receive a fair share of the gross margin compared to dealers in the nearby countries.

Because the level of the gross margin is low, the oil industry in Thailand has a relatively low profit margin compared to the other businesses in the country. In 1995, average profit margin of the oil industry, defined here as the ratio of average oil companies profit to total sales, was only 2.9% compared to 21.3% in hotel industry, 22.4% in banking 34% in insurance and 62.5% in entertainment business. Oil business profit margin was also low compared to that in the non-service sector such as pulp and paper (10.5%), textile (31.1%), vehicles and parts (46%). In fact, oil business profit margin has been among the lowest compared with the other major service and manufacturing sectors.

5.4.2 Profitability of retail station business

The objective of this section of the study is to estimate profitability level of retail stations by analyzing the survey results concerning revenues and expenditures structure of stations in various locations. We have selected seven locations from all regions of the country and attempted to include stations of various brands and types. The results are reported in Table 5.31 to Table 5.37. The structure of the profitability tables is as follows.

Volume - we have used monthly volume of the stations obtained from the interviews. The volume include all grades of gasoline and HSD.

Station characteristics - these are information concerning price level and station size measured by land area and number of fuel nozzles

Monthly expenditures - These are total station expenditures including wage and salary of all workers, utility costs, monthly lease payment, maintenance costs, and other station operating costs. The expenditures exclude fuel and product acquisition costs, interest costs and VAT.

Monthly station lease - This is the monthly lease payment to oil company. Dealer owned and some joint investment stations do not pay monthly lease

Fuel revenue - Fuel revenue here is defined as the product of total monthly sales volume and average net dealer margin. This is the station total fuel income before station expenditures.

CV revenue - This is the net income from C-store derived by assuming that C-store will earn the dealer 18% margin before operating expenditures. C-store operating expenditures are included in the monthly station expenses above.

Other revenues - These are all other station revenues obtained from lube oil services, rental incomes from food stalls, tyre repair shops, car parking, etc.

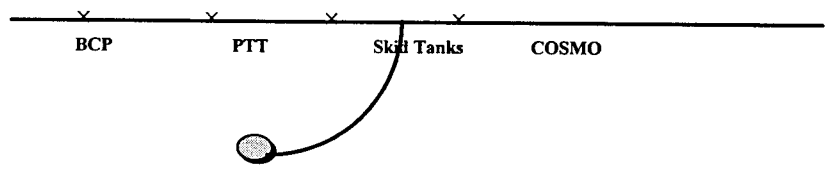
Cash margin - This is the difference between total revenue and monthly expenditures. Interest costs, credit costs and revenues from wholesale oil sales are not included in the calculated cash margin and loss shown. Figures in brackets are negative cash margins. Although cash margins do not represent profit (loss) of retail stations, stations with poor cash margins world normally have poor business profitability.

a) Location A - Northeast. This is a newly developed area and stations are recently built. Bangchak and PTT are both dealer owned medium-size stations while Cosmo is a relatively large one. Bangchak volume were about 200,000 litres and earning about 65 satang per litre margin. The margin looked quite high but was consistent with that of PTT's. Total monthly station expenditure of Bangchak was 120,000 baht, 70% of which was labor cost. On the other hand, fuel revenues were 130,000 baht. Thus fuel revenues barely covered the operating costs of the station. In such case Bangchak station must try to earn extra revenues from other station businesses. In this case, the station owns a C-store which could generate a net monthly income of 65,000 baht. Together with other station revenues of about 22,000 baht, the station was making a monthly cash margin of 97,500 baht before taxes and interest charges. Interest charges were from oil and C-store stocks and credit to customers. The PTT station earned less profit compared to Bangchak's, which was due to the lower sales volume of the PTT station.

The Cosmo station faced a situation where fuel revenues alone fell significantly short of the station expenditures. Half of the Cosmo station expenditures was monthly lease. To overcome the problem, Cosmo raised its extra station revenues from C-store and other lube and station area rental businesses. The station managed to earn about 60,000 baht a month cash margin plus some undisclosed wholesale oil revenues.

Table 5.31 Cash Margin of Service Station

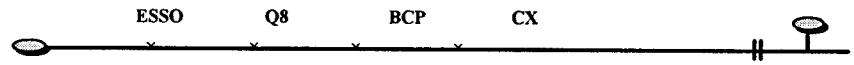
Location A : Main Highway (New Development) - Northeast



7 June 1997	Brand				
	BCP 1996	PTT 1997	Skid Tank	Skid Tank	Cosmo late 1996
Volume (lt)	200,000	150,000	125,000 60% credit free gifts	200,000 no credit free gifts	400,000
Land area (rai)	5	3	5	8	10
No. of Fuel Nozzles	20	20	2	2	24
ULG Price	9.61	9.58	-	-	9.58
HSD Price	8.67	8.68	8.29	8.09	8.75
Margin (stg / lt)	65	60-65	50	30	40 ?
	(12 million)	(11.5 million)			(20 million)
Monthly Expenditure	120,000	100,000	30,000	30,000	240,000
Monthly Station Lease	Dealer owned	Dealer owned	Dealer owned	Dealer owned	120,000
Total Expenditure	**120,000**	**100,000**	**30,000**	**30,000**	**360,000**
Fuel Revenue	130,000	97,500	62,500	60,000	160,000
CV Revenue (18%)	65,000	27,000	7,000	-	81,000
Other Revenues	22,500	37,500	500	18,000	60,000 lube / rental
Total Revenue	**217,500**	**162,000**	**70,000**	**78,000**	**301,000**
Cash Margin	**97,500** minus interest costs	**62,000** minus interest costs	**40,000** minus credit costs	**48,000**	**-59,000** plus wholesale revenue

Table 5.32 Cash Margin of Service Station

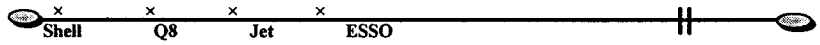
Location B : Main Highway (Outbound) - Central



15 February 1997	Brand			
	ESSO	Q8	BCP	CX
Volume (lt)	6-800,000	400,000	490,000	400,000
Land area (rai)	7	5	3	5
No. of Fuel Nozzles	20	26	30	38
ULG Price	9.75	9.73	9.73	9.75
HSD Price	8.66	8.63	8.64	8.66
Margin (stg / lt)	30-35+R	30	30	30-40
Monthly Expenditure	390,000	230,000	300,000	150,000
Monthly Station Lease	90,000	30,000	Co. owned	Joint inv.
Total Expenditure	**480,000**	**260,000**	**300,000**	**150,000**
Fuel Revenue	280,000	120,000	147,000	128,000
CV Revenue (18%)	135,000	110,000	243,000	38,000
Other Revenues	70,000	100,000	-	24,000
Total Revenue	**485,000**	**330,000**	**390,000**	**190,000**
Cash Margin	5,000	70,000	90,000	40,000

Table 5.33 Cash Margin of Service Station

Location C : Main Highway - Central



16 February 1997	Brand			
	Shell	**Q8**	**Jet**	**ESSO**
Volume (lt)	200,000?	600,000	200,000	250,000 80 % Credit
Land area (rai)	2.5	8.5	2	2
No. of fuel Nozzles	16	22	18	12
ULG Price	9.75	9.59	9.35	9.75
HSD Price	8.66	8.49	8.49	8.66
Margin (stg / lt)	30	35	15?	30-35
Monthly Expenditure	160,000	400,000	150,000	70,000
Monthly Station Lease	2-30,000?	35000	Co. owned	14000
Total Expenditure	**190,000**	**435,000**	**150,000**	**84,000**
Fuel Revenue	60,000	220,000	30,000	77,500
CV Revenue (18%)	100,000?	200,000	135,000	-
Other Revenues	-	60,000	-	7,400
Total Revenue	**160,000**	**480,000**	**165,000**	**84,900**
Cash Margin	**-30,000**	**45,000**	**15,000**	**900**

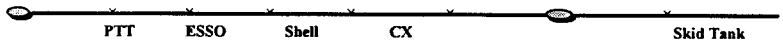
Table 5.34 Cash Margin of Service Station

Location D : Inside City Limit - North

21 February 1997	Brand			
	Jet	CX	Shell	PTT
Volume (lt)	350,000	300,000	600,000 (used to sell 1 mmlt.)	250,000
Land area (rai)	1.5	3	4	5
No. of Fuel Nozzles	18	7	21	7
ULG Price	9.69	9.60	9.86	9.85
HSD Price	8.55	8.60	8.77	8.75
Margin (stg / it)	15 ?	30-35	35	30-40
Monthly Expenditure	150,000	110,000	250,000	90,000
Monthly Station Lease	Co. owned	7,000 (JI)	10,000 ?	Dealer owned
Total Expenditure	**150,000**	**117,000**	**260,000**	**90,000**
Fuel Revenue	52,500	93,000	210,000	80,000
CV Revenue (18%)	135,000	22,000	81,000	-
Other Revenues	2,000	30,000	42,000	40,000
Total Revenue	**189,500**	**145,000**	**333,000**	**120,000**
Cash Margin	**39,500**	**28,000**	**73,000**	**30,000**

Table 5.35 Cash Margin of Service Station

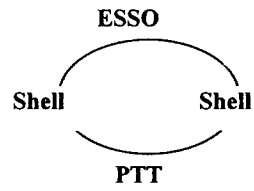
Location E : Main Highway - South



1 March 1997	Brand				
	PTT	ESSO	Shell	CX	Skid Tank
Volume (lt)	450,000	230,000	600,000	230,000	30,000
Land area (rai)	3.5	-	5	3	0.5
No. of Fuel Nozzles	13	12	18	11	2
ULG Price	9.83	9.82	9.82	9.83	-
HSD Price	8.69	8.69	8.70	8.69	8.50
Margin (stg / lt)	**35-40**	**21-30**	**30-35**	**28-40**	65
Monthly Expenditure	160,000	70,000	170,000	91,000	11,000
Monthly Station Lease	30,000	5,000	9,000	20,000	-
Total Expenditure	**190,000**	**75,000**	**179,000**	**111,000**	**11,000**
Fuel Revenue	163,000	55,000	195,000	83,600	19,500
CV Revenue (18%)	27,000	-	-	7,200	-
Other Revenues	21,000	30,000	26,000	56,000 (hub)	10,000 (shop)
Total Revenue	**211,000**	**85,000**	**221,000**	**146,800**	**29,500**
Cash Margin	**21,000**	**10,000**	**42,000**	**35,800**	**18,500**

Table 5.36 Cash Margin of Service Station

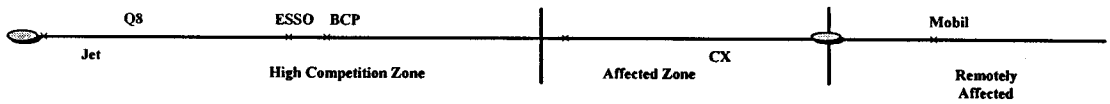
Location F : Inside City Limit - South



2 March 1997	Brand			
	Shell	**PTT**	**ESSO**	**Shell**
Volume (lt)	1,150,000 (70% wholesale)	250,000	135,000	180,000
Land area (rai)	5	2	4	1.5
No. of Fuel Nozzles	12	9	26	21
ULG Price	9.94	9.90	9.90	9.94
HSD Price	8.75	8.80	8.76	8.75
Margin (stg / lt)	40+R	40	30 ?	30-40
Monthly Expenditure	150,000	76,000	90,000	120,000
Monthly Station Lease	Dealer owned	Dealer owned	30,000 ?	15,000 ?
Total Expenditure	**150,000**	**76,000**	**120,000**	**135,000**
Fuel Revenue	234,000	100,000	40,500	61,200
				24,000 fine
CV Revenue (18%)	-	-	-	-
Other Revenues	20,000	11,000	10,000	90,000
				(lub carwash)
Total Revenue	**254,000**	**111,000**	**50,500**	**151,200**
Cash Margin	**104,000**	**35,000**	**-69,500**	**16,200**

Table 5.37 Cash Margin of Service Station

Location G : Bangkok's Suburb



22 June 1997	Brand				
	Q8	ESSO	BCP	CX 1997	Mobil 1996
Volume (lt) Jet	120,000 no credit free gifts	1,000,000 40% credit free gifts	400,000 40% credit free gifts	300,000 no credit free gifts	240,000 free gifts
Land area (rai)	3	2.5	1	3	4
No. of Fuel Nozzles	24	30	16	24	
ULG Price (8.99)	9.29	8.99	8.99	9.39	9.35
HSD Price (8.09)	8.24	8.09	8.09	8.49	8.49
Margin (stg / lt)	38	30	40 ?	30	30
Monthly Expenditure	220,000	400,000	150,000	350,000	250,000
Monthly Station Lease	50,000 ?	100,000	Dealer owned	150,000	80,000
Total Expenditure	**270,000**	**500,000**	**150,000**	**500,000**	**330,000**
Fuel Revenue	45,600	300,000	160,000	90,000	72,000
CV Revenue (18%)	91,800	80,000	54,000	160,000	81,000
Other Revenues	40,000	120,000 carwash / lub	50,000 carwash / lub	15,000	40,000
Total Revenue	**177,400**	**500,000**	**264,000**	**265,000**	**193,000**
Cash Margin	**-92,600**	**0**	**114,000** minus interest costs	**-235,000**	**-137,000**

Skid tanks found in this location could sell about 100,000-200,000 litres of HSD a month, about the same level as the PTT and Bangchak stations. But the skid-tanks had relatively low monthly station operating expenditures of about 30,000 baht. At this level of volume and reasonable amount of margins (30-50 satang), the skid-tanks could survive without having other income source. However, they usually set up a small store or a food stall and could earn several thousand baht of extra income. The two skid-tanks shown in the Table earned about 40,000 baht in monthly cash margin. According to the owners, skid-tanks used to earn much higher profit than this because sales volume were much higher a few years ago. Their sales volume have been severely affected by a flood of new skid-tanks in recent years.

b) Location B-Central. This is a main highway location and stations in the area are large having high monthly throughput. In this particular area, Esso had the highest volume of between 6-800,000 litres with the margins of between 30-35 satang plus high volume rebates (R). (see Table 5.32) However, the station also had high operating expenditures of about 390,000 baht including 90,000 baht monthly lease. Thus fuel revenues of about 280,000 baht were not enough to cover monthly expenditures. Luckily, the station was able to generate significant income from C-store of 135,000 baht (net) per month plus 70,000 baht of other revenues. The station was then able to make monthly cash margin of about 95,000 baht.

Q8, Bangchak and Caltex all had about the same volume of about 4-500,000 litres and had faced similar situation of fuel revenues falling short of station expenditures. All three stations needed to generate extra income to cover the expenses and they all depended on revenues from C-stores. They were all making reasonable amount of net profits. Relatively speaking, Bangchak C-store was the best seller in that location.

c) Location C-Central. This is another main highway location with the presence of a Jet station. (see Table 5.33). In this particular location, Shell and Esso decided not to engage in price cutting and were selling at their normal price level. Q8, on the other hand, decided to match Jet HSD price but not gasoline. We estimated that both Shell and Esso volumes were probably in the 200,000 litres range which were about the same as that of Jet. Shell and Jet were both 1-2 months old stations and thus having low volume. Q8 was the leading station in that area and could sell about 600,000 litres a month.

We estimated that both Shell and Esso were not making profit. Firstly the volume were low because of their relatively high prices. Secondly, they had to pay high station lease. Thirdly, their expenditures were high. Shell employed a large crew of station

boys. Esso, on the other hand, employed very few station boys in order to cut down station expenditures but 80% of the sales were on credit sales. Although Shell probably had reasonable revenues from C-store, Esso had none. Overall, they both were probably not making any money from the business.

Jet station was probably not profitable either since it had high station expenditures but very low fuel revenue. Its business survival depended clearly on the sales of C-store alone.

On the other hand, Q8 was doing relatively well. Despite high volume, fuel revenue alone was not enough to cover the expenses and the station needed to earn incomes from the other sources particularly from C-store. Q8's C-store was the best selling in the area. Overall, Q8 probably made about 80,000 a month cash margin .

d) Location D-North. This is a city location in the North. Again, There was a Jet station and only Caltex was trying to partially match Jet's prices. Shell and PTT decided to sell at their normal prices. Shell used to be the leader in this area having been able to sell about a million litres per month. With rising competition, the station volume were dropped to about 600,000 litres but still were relatively high compared to the nearby stations. Shell had very high monthly station expenses of 250,000 baht because it needed a large station boy crew. However, fuel revenues were nearly able to cover the expenses because it had high sales volume. Thus profits must come from other income sources like C-store and lube services. The station probably earned about 90,000 baht monthly cash margin.

PTT and Caltex had very similar revenue and cost structures and fuel revenues fell short of the expenditures, but not by much. With some extra revenues, both probably making about 30,000 baht monthly cash margin each. As for Jet, fuel revenues probably fell far short of the expenditures and the station needed to generate significant income from C-store in order to be profitable.

e) Location E-South. This is a main highway location in the South. We noted that the C-store concept was still not very popular here as very few stations had invested in C-stores.

In this particular location, PTT and Shell were the two leading stations and could sell at relatively high volume of 450,000 litres and 600,000 litres, respectively. Both stations also had similar expenditures of about 160,000-170,000 baht a month. With the standard margins of between 30-40 satang per litres, both stations were able to cover the monthly expenditure from fuel revenues. However, profits were earned from lube oil

services and snack shops. Both stations probably made about 50,000 baht in monthly cash margin.

Esso and Caltex were both 230,000 litres stations and had about 70,000-90,000 baht monthly expenditures. Their fuel revenues were not enough to cover the expenditures and tried to generate additional income from lube services. Caltex was doing well in lube oil income. Thus the station could make about 50,000 baht monthly profit. Esso could generate reasonable amount of lube oil income but its fuel income was quite poor. Overall, Esso hardly had any cash margin at all.

We also interviewed skid-tanks. Sale volume of a skid-tank in this location was very poor but the owner tried to keep the expenditures down to the minimum. He also set up a small shop in the station and could earn a cash margin of about 18,000 baht per month.

f) Location F-South. This is a city location and stations were selling at a relatively small volume. However, there was a Shell wholesaler in the area who had 1.15 million litres volume a month, 70% of which were wholesale sales. (see Table 5.36) Because the volume was so significant, the station could generate strong fuel revenues to cover the expenses. Together with lube oil revenues, the station could earn 100,000 baht a month cash margin excluding revenues from high volume rebates and wholesale margins.

At the other extreme, Esso station could sell only 135,000 litres a month. Fuel revenue could pay only half of the expenses. With poor prospects of making extra incomes, the station was making a loss of about 40,000 baht a month.

Another Shell station with 180,000 litres volume was also not profitable despite having significant revenues from lube oil and car wash.

PTT station had a reasonable level of sales volume of 250,000 litres. Although the station had no significant extra source of revenues, it could earn some profit by keeping the expenditures low. The station did not have to pay monthly lease which could otherwise erase all of its small profit.

g) Location G-Bangkok's Suburb. This is the area of high competition in Bangkok. There is a Jet station at the end of this main street who persistently cut the selling prices. Nearly all of the stations in about 2 kilometres distant from Jet tried to match Jet's prices. This is the 'high competition' zone. The effect of Jet pricing could be felt several kilometres away in the 'partially affected zone' where stations in that area partially lowered the prices from the normal price level.

The stations in the high competition zone are Q8, Esso and Bangchak as shown in Table 5.37. Esso was the largest station in the area and could sell about a million litres of fuel a month. The station had monthly expenditures of about 400,000 baht including 100,000 baht a month lease. The station obtained only 30 satang per litre margin without rebate despite high sales volume. This was because the station must share the cost with the oil company resulting from price cutting in order to match Jet's prices. Thus fuel revenues alone could not cover the station expenses. However, the station could generate significant revenues from C-store, lube and car wash and thus could make monthly cash margin of about 100,000 baht before credit costs.

Bangchak was also a high volume station of 400,000 litres with significantly lower station costs compared to Esso as Bangchak did not have to pay station lease. Fuel revenues were probably just enough to cover station expenses and profits, of about 100,000 baht, were earned from other revenues.

Q8 was a very low throughput station in the area. The station only partially matched Jet's prices and clearly became uncompetitive. With poor volume, fuel revenues fell short of the expenditures and other supplementary incomes were unable to pull the station out of the red. This station was probably making significant losses.

Caltex and Mobil were located outside the high competition zone but were selling at partially reduced prices. Caltex could sell at 300,000 litres level but the station had to pay 150,000 baht monthly lease. Thus fuel revenues fell far short of station expenses. Although the station could generate large C-store revenue, it was still making significant loss of about 85,000 baht a month. To survive, the station needs to sell over 600,000 litres a month or twice as high as the present volume.

Mobil also faced a similar situation as Caltex. Sales volume of 244,000 litres a month were not enough to cover high station lease. To barely survive, the volume need to be in the 400,000 litres range.

In conclusion, it is clear from our survey that sales volume of retail station have been strongly affected by growing competition resulting from the deregulation. Despite higher margins, a large number of stations could not cover their monthly station expenses from fuel revenue. A station that needs not pay monthly lease could get by with fuel volume of about 250,000 litres. However, for those who need to pay station leases, the minimum station volume must be raised significantly, and this is not an easy task to do. Thus more and more stations are seeking extra revenues from other oil and non-oil businesses. Lube oil services could help the station revenues but more and more stations are doing without this business in order to improve 'cleanliness' of the stations.

Therefore, revenues must be generated from the other sources, and the most popular one at present seems to be the construction of C-store. But no one knows how long the popularity of C-store in retail stations will hold.

As for the future trend in retail competition, the following conclusion could be drawn.

- The industry is going through a period of rationalization which will continue through short to medium term. Many areas of the country are being over-pumped resulting in declining throughput per station. As a result, many unprofitable stations will be closed down. Some oil companies may have to cease retail oil business in the country while the others will scale down their investment. The economic crisis in Thailand will certainly worsen the situation for all oil companies.
- The tendency that the economic crisis will be prolonged has diminished the hope of full retail oil industry business recovery as the volume growth of the industry will be relatively low for several more years compared to that in the past.
- Volume growth of an oil company must come at the expense of the others as the volume growth of the industry will be poor.
- Competition for volume will certainly be intensified among existing networks using both price and non-price tactics, with the latter being stressed. For many companies, the strategy is probably to defend the volume rather than trying to expand it.
- Price competition used to be on a local area basis induced by one or two stations in the area and expanded throughout the entire area through chain effect. It is likely that more and more areas will come under price competition as new non-major stations using low price tactics are spread out.
- Experience has told us that price collusion between retail stations of different brands in a local area do not work well. This will continue to be true.
- As long as PTT continues to be the "price leader", retail margins may not be growing significantly from today's level in the next few years. The government will continue to follow the margin trend very closely and will continue to exercise its indirect price "control" through PTT. It is interesting to see how the privatization of PTT, if and when it happens, will affect future retail pricing and hence the margin of the industry.
- Significant investment in non-price competition in retail sales will be forth coming. Stations will continue to be modernized and the concept of complete consumer service at retail stations will be widespread. This is done in order to earn the needed non-oil revenues as well as to meet consumer's growing expectation of good services at the pump.
- Major oil companies will not go for price cutting and will use the tactic only to defend their business in certain local areas when provoked. However, they

Chapter 6

The Impact of the Liberalization in Consumers' Perspective

This chapter will analyze the effects of the oil price deregulation on consumers as perceived by users of retail oil products. The basic information for the study came from field survey of the five main regions of the country. Consumers were asked to provide their opinions concerning significant factors affecting their decisions to buy oil products from a particular oil company such as product quality, service, advertisement and price. Consumers were also asked to evaluate the effect of oil price deregulation on price level, competition, product and service quality and consumers as a whole.

6.1 Basic information

Table 6.1 summarizes basic information concerning oil consumer survey. The detail of the survey results are shown in Appendix B. According to the table, 312 consumers were interviewed in this study. Significant number of consumers interviewed were non-office workers (38%), some were self employed (21%), company employees (18%) and government officials (12.5%).

About 46% of interviewees drove pick-up trucks, 23% owned gasoline cars, 16% used motorcycle and 14% drove trucks and buses. This also coincides with fuel share as 60% of interviewees used HSD, 30% used ULG and the rest (10%) used other kinds of gasoline. Very small number of oil consumers interviewed used regular gasoline (35%). As expected, HSD users have the strongest representation in the sample because the interviews were conducted mainly in up-country areas. As shown in the table, 69% of the samples were taken in up-country provinces.

It is also interesting to note that the five major oil brands have still occupied the top five ranking in consumers' preference. According to the table, PTT came first as the oil brand normally used by oil consumers interviewed. About 29% of the interviewees stated that they normally use PTT brand while Shell came second with 25% followed by Caltex and ESSO with 15% and 8%, respectively. BCP or Bangchak came fifth with 7% followed by other non-major brands. However, it was somewhat of a surprise to see relatively strong response for Caltex as we would expect the company to follow Bangchak in terms of retail sales.

Table 6.1 Oil Consumer Survey : Basic Information

1. Number of Consumers Interviewed	312
2. Type of Vehicles driven	**%**
Pick-up	46
Car	23
Motorcycle	16
Bus/Truck	14
3. Area	**%**
N	23
NE	12
C	13
S	21
BKK	31
4. Profession	**%**
Workers	38
Self employee	21
Company employee	18
Government official	13
Farmer	6
Student	3
None	1
5. Type of Fuel Used	**%**
HSD	60
ULG	30
Super	6
Regulr	4
6. Oil Brand Normally Using	**%**
PTT	29
Shell	25
Caltex	15
Esso	8
BCP	7
Total Majors	85
Total Independents	15

6.2 Factors affecting consumer decisions in selecting retail stations

The main objective of this part of the interview was to find out about the factors that could affect consumer's buying decision, particularly the oil price. These factors are as follows.

- oil price
- oil product quality
- service quality
- brand loyalty
- convenience
- free gifts
- clean rest rooms
- advertisement appealing

Consumers were asked to rank those factors one by one as most significant, significant and not significant in determining their buying decisions from a particular oil brand. In other words, there could be several most significant factors as seen by a particular consumer. Their responses are summarized in Table 6.2 and the detail are shown in Appendix B.

According to the interview, oil product quality has received the highest score among those ranked as the most significant factor by consumers. In fact, the product quality is so strong that 74% of consumers ranked it as the most significant and significant factor in making buying decision.

The other most important factors that have received the next highest scores are convenience and oil price. 18% of consumers said they would, among other things, buy from stations that are easily accessible or not too far. The third most important factor is

oil price. Oil price factor has received 15% score which is less than half of that of the product quality. According to the interview, most consumers found in our interview bought the oil from major stations. In their opinion, oil prices of major stations, including most independents, were not much different from each other. The prices also tended to fluctuate in unison among these stations. Thus the buying decisions were made more or less on the basis of product quality and convenience first, and then price.

As for the factors ranked 'significant' by consumers, service quality came first with 53.8% followed by clean rest rooms 38.4%. Again, consumers gave high value to quality aspect of the business as shown by a very high score. Cleanliness, as expected, also received high score as many Thai consumers are concerned with rest room condition. As for oil price, the factor came third in the level of significance. The score is close to cleanliness but is a less than service quality.

Leading the not significant' factors is free gifts. This is somewhat of a surprise since most station owners tend to think that Thai oil consumers do like free gifts as stated earlier. In fact it is nearly a normal business practice in many areas that retail stations provide some free gifts to their customers. However, what has happened in consumer survey was that consumers may not want to admit openly that they consider free gifts as a significant factor in making buying decision.

Other 'not significant' factors found in the surveys were advertisement effect and brand loyalty. A large number of consumers said they bought the product not as a result of the advertisement nor because they were loyal to a particular brand.

Table 6.2 Oil Consumer Survey : Factors Affecting Consumer Buying Decision

	% Responding
Most Singnificant :	
Oil Product Quality	38.4
Location	18
Oil Price	15
Significant :	
Service Quality	53.8
Cleanliness	38.4
Oil Price	36.5
Not Significant :	
Free Gifts	61.2
Advertisement	49.3
Brand Loyalty	44.2

Note : for further detail , see Appendix B

6.3 Frequency in visiting retail stations

The next set of questions in the survey were to find out how often a customer visit a service station by the objective of the visit. Seven objectives were identified and the survey results are as follows.

- To buy fuel - 40% of the customers said they stopped by at a service station to buy fuel less than 150 times a year. These were customers owning passenger vehicles. The rest of the customers visited retail stations nearly everyday with some more than once a day. These were customers driving motorcycles, buses and trucks.

- To change lube oil - nearly 70% of the customers changed lube oil at stations 12 times a year or less. Other customers include those who changed lube oil more than 12 times a year as well as those who never changed lube oil at stations.

- To have car washed - 37.8% of customers had their cars washed at retail stations less than 50 times a year.

- To have tyres/engines fixed - only 20.5% of customers had their tyres/engines fixed at retail stations once a month or less. Most customers had other alternatives.

- To visit convenience store - 12.2% of customers stopped by at convenience stores about once a week or less while 27.5% said they visited station stores between once to three times a week.

- To have meals in restaurants - only 8.6% of customers said they had meals in station restaurants about once a week or less while 22.7% said they had the meals there between once to three times a week.

- To use rest rooms - a number of customers used rest rooms in retail stations. 8.3% said they used the service once a week or less. 43.6% said they used station rest rooms between 1 to three times a week.

6.4 Oil company image

Customers were asked to evaluate oil companies in terms of fuel quality, service, station design, cleanliness and other. As can be seen below, PTT led the other oil companies in all image categories. PTT's image, according to the survey, was relatively impressive as viewed by consumers (see Table 6.4).

Table 6.3 Frequency in Visiting Retail Stations

	Frequency (Time per year)	% of Customer
1.	**To buy fuel**	
	1 – 150	40
	151 – 350	28
	more than 350	31
2.	**To change lube oil**	
	1 – 12	69.5
	Others	30.5
3.	**To have tyre washed**	
	1 – 50	37.8
	51 – 100	16.3
	Others	45.7
4.	**To have type / engine fixed**	
	1 – 12	20.5
	Others	79.5
5.	**To visit convenience store**	
	1 – 50	12.2
	51 – 100	27.5
	Others	60.3
6.	**To have meals in restaurant**	
	1 – 50	8.6
	51 – 100	22.7
	Others	68.7
7.	**To use rest room**	
	1 – 50	8.3
	51 – 100	43.6
	Others	48.1

Note : See Appendix B for more detail

Table 6.4 Oil Company Image

		Brand	%
1. having best fuel quality	:	PTT	27
		Shell	26
		Esso	13
		Caltex	13
2. having best service	:	PTT	25
		Shell	20
		Esso	11
		Caltex	11
3. having best station design	:	PTT	27
		Shell	17
		Esso	16
		Caltex	10
4. Cleanliness	:	PTT	31
		Shell	15
		Esso	13
		Caltex	11
6. having C-store	:	PTT	23
		Shell	14
		Esso	12
		Caltex	10

Note : See Appendix B for detail

- having best fuel quality - PTT and Shell led the other oil companies in terms of fuel quality image with PTT having a slight edge over Shell. 27% of consumers interviewed gave PTT the best fuel quality score while Shell was given 26%. Esso and Caltex both obtained 13% score each. These four companies earned nearly 80% of the best fuel quality score from consumers in the interview.

- having best service - PTT ranked best with 25% score in terms of station service quality, followed by Shell with 20%. Again, Esso and Caltex came third with equal score of 11% each.

- having best station design - Consumers appeared to be impressed by PTT's station design as 27% of them gave PTT the highest score in this category. Shell and Bangchak came a distant second and third with nearly similar score of 17% and 16% respectively. This is probably consistent with the actual situation as during the time of the interview PTT, Shell and Bangchak were all building their new stations or converting the old ones to the new designs. Apparently, consumers took note of the changes. BP's station design also came out surprisingly strong as the company took the fourth place with 10% score.

- cleanliness - PTT stations were found to be most clean compared to the others. 31% of consumers interviewed voted for PTT in this category. Shell came second with 15% and BP again came surprisingly strong with 13% followed by Bangchak 11%.

- having modern C-store - C-store concept is getting to be very popular and a number of stations are now providing this kind of service to consumers. As the C-store service will certainly become more widespread, we would like to know how consumers rated the standard of C-store facility in retail stations. According to the survey results, 23% of consumers thought PTT stations had the most modern C-store facility followed by Shell, Esso and Caltex with 14%, 12% and 10% votes, respectively.

6.5 Oil pricing

One of the crucial questions in the interview was about consumers' awareness of oil price differential among oil companies after the prices were deregulated. Consumers were asked to provide their opinions concerning various aspects of oil prices which could be summarized as follows. (see Table 6.5).

- brands having relatively high prices - according to the interview results, 18% of consumers said Shell was the highest price company while Esso and Caltex came second with 11% and 10% scores. Bangchak came fourth but the percentage was low at only 6%.

- brands having relatively low prices - in the low price category, PTT came first with 18%, followed by Bangchak with 11%. Jet, a new comer with relatively small number of retail stations was able to capture some consumers attention to its low price strategy. About 8% of the consumers said Jet had relatively low price. Esso came fourth with only 4% score.

- % of consumers noticing retail price differential at stations - consumers were asked whether they ever noticed price differential between different oil brands. 60% of those interviewed said they saw price differential between retail stations of different brands. However, quite a large number of consumers also said oil companies were selling oil at about the same price, particularly between the major brands.

- Normal range of price differential noticed - for those who said they saw price differential at retail stations, the range of price differential seen was between 1 to 25 satang per liter. This was also a normal price range between major and independent brands found in most areas.

Table 6.5 Consumers Opinion Concerning Oil Pricing at Retail Stations

Brand having relatively high prices	:	Shell	18%
		Esso	11%
		Caltex	10%
		BCP	6%
Brand having relatively low prices	:	PTT	18%
		BCP	11%
		Jet	8%
		Esso	4%
% noticed retail price differential at stations	:		60
Normal range of price differential noticed	:		1 - 25 stg/lt
% of consumers seeking low price stations to fill	:		30
Oil retailing acompetitive business ?	:		95%

- percentage of consumers seeking low price stations to fill - consumers were asked whether they attempted to fill their vehicles at low price stations, given that they had noticed price differential between brands. However, only 30% said they would try to fill at low price stations. A number of them said they would try to fill at low price stations only when price differential was significantly large, perhaps over 10 satang per liter differential.

- Oil retailing a competitive business. - 95% of consumers said they think oil retailing in Thailand is a competitive business overall.

6.6 Effects of oil price deregulation

The final set of questions in the consumer interview were about the effect of the price deregulation on various aspects of oil business as perceived by users of oil products. Consumers were asked to provide comments on price level, competition and others including the overall effects on oil users as a result of the deregulation. (see Table 6.6)

- effect on price level - 65% of the consumers interviewed believed the deregulation would make oil prices higher. This was nearly two -third of the consumers. On the other hand, only 9% of the interviewees thought the price would be lower while 13% said the deregulation probably had no effect on price level.

- effect on competition level- slightly more than half of the consumers interviewed said the level of competition has become significantly stronger since the deregulation while 34% said competition has not been so strong. A small number of consumers even said the level of competition has declined. However, the majority of consumers said competition has intensified.

Table 6.6 Effect of Oil Price Deregulation

On price level	make price higher	65%
	make price lower	9%
	no effect	13%
On competition	have become stronger	52%
	moderate	34%
	lessen	8%
On number of station	increasing	77%
	no effect	13%
On oil quality	improving	39%
	no effect	13%
On services	improving	79%
	no effect	13%
On entries	stimulating	53%
	no effect	21%
On oil consumption behavior	no change	71%
	use more oil	22%
Overall effect of deregulation on consumers	make consumers off	37%
	make consumers it worse off	26%
	no change	26%

- effect on number of station - 77% of those interviewed agreed that the number of retail stations have increased as a result of the deregulation.

- effect on oil quality - over one third of interviewees said oil quality has probably improved as a result of competition after the deregulation.

- effect on services - nearly 80% of consumers interviewed said they have seen improvements in station services after the deregulation. Again, this has probably been the result of intensified competition.

- effect on entries - more than half of the retail customers said the deregulation probably has stimulated entries into retail business. This coincides with consumer responses concerning growing number of competition after the deregulation.

- on oil consumption behavior of consumers - over 70% of the oil consumers interviewed said they have not changed their oil consumption behavior as a result of the deregulation.

- overall effect of the deregulation on consumers - in general the largest group of consumers interviewed agreed that the deregulation has had a positive effect overall on users of oil. This is shown by 37% positive response of the consumers who gave the interview. However, a quarter of the consumers tend to think that they were worse off while another quarter of the consumers thought there was no change in the overall effect.

However, it could be concluded that the consumers interviewed had provided positive responses to the effects of the deregulation on most aspects of the oil business. They believed the level of competition, product and service quality and availability have been improved as a result of the deregulation.

Chapter 7

Policy Recommendations

Since 1991, the government has taken gradual steps towards liberalizing the oil market. This study shows that the liberalization has yielded substantial tangible gains to consumers, service stations, oil companies, taxpayers and the society as a whole. However, there remain markets that require deeper liberalization and distortions that warrant correction. In this chapter, we outline some policy recommendations for further liberalization.

7.1 Pushing for Further Liberalization

The current economic crisis poses a major obstacle to further liberalize and deregulate the oil industry. Economic contraction, mounting inflation, and rising unemployment rate are the economic woes that would translate into political pressure against liberalization. Yet, this is the prime time for Thailand to deregulate the concerned industries so that the economy would be better able to respond and adjust itself to the crisis and recover.

Liberalizing the LPG markets

Although most oil markets have already been liberalized, the LPG market remains mostly under the control of the government. In late 1997, the government decided to liberalize the LPG market through three steps. First, the current fixed LPG price was replaced by a semi-floating pricing scheme whereby the product price will be adjusted occasionally in response to movements in the international benchmark price. Second, the LPG import ban has been lifted to promote more competition in the market. The final step is to allow the LPG price to float freely. Consequently, the control on retail prices and on locally produced and imported LPG prices will also be lifted. This seems to be the right direction to liberalize the LPG market.

On the supply side, the PTT--due to its extensive investment on the natural gas pipeline network--has been given the exclusive right to buy natural gas from gas field operators and to operate the pipeline. The PTT transports natural gas from the fields to separation plants. The company also operates several separation plants producing approximately half of the domestic output. Other plants are operated by other local refineries and petrochemical plants. To break the current monopoly in natural gas purchase, the government plans to make the pipelines accessible to all LPG producers so that these producers may negotiate deals directly with gas field operators. The PTT is to charge a transmission fee for usage of its pipeline for gas delivery.

To ensure fair competition in the production and the refinery business, we endorse The National Energy Policy Office's (NEPO) proposal to separate the pipeline operation unit from the PTT to become an independent company during the privatization process.

Reconsidering BMA's Regulation of Service Station and LPG Retailing

Since the 1991 liberalization and the easing of service station construction regulation by the Public Works Department, Ministry of Interior, there has been a big jump in the number of new service stations in most parts of the country. This results in fierce price and non-price competition in many areas. In downtown Bangkok, however, there has been so far only a few new entrants and little price competition. With little free land left in downtown Bangkok, it is almost impossible to set up a new service station under the current Bangkok Metropolitan Administration (BMA)'s strict safety regulation. The regulation requires, among other things, that the station have a minimal area and be distant from public places. With advanced safety technology, the BMA should examine the possibility of easing the current restrictions without compromising public safety.

The LPG retail market in Bangkok is currently subjected to a rather lenient safety regulation. Consequently, the BMA has been reluctant to grant new permits. As a result, setting up an LPG retail store in downtown Bangkok is nearly impossible, rendering the distribution of LPG more costly. To promote efficient LPG distribution while meeting strict safety standard, the government should issue clear regulations with

regard to setting a retail store in Bangkok or help oil companies to coordinate in establishing LPG storage centers in the suburban areas.

Restoring Investors' Confidence

Currently, the most urgent task for the government is to restore investors' confidence, without which the Thai economy will be doomed to fall into the vicious circle of illiquidity, capital outflow, continuing devaluation of baht and high interest rate. The government has to demonstrate its commitment to full liberalization policy and to maintain policy consistency. It should never reverse the liberalization policy without any well-justified reasons. Neither should the government attempt to intervene in the market without proper consideration since it can easily scare off foreign investors. An example of a regulation that shakes investors' confidence in the government is the announcement in December 1997 that requires all oil companies to notify any price changes to the Minister of the Prime Minister Office three days in advance.

7.2 Eliminating Price Distortions

As discussed in the study, price distortion either through tax or subsidy results in efficiency losses. Abolishing the existing price-distorting practices will thus increase welfare of the society.

Stopping subsidizing interest groups

Although the role of the Oil Fund has been reduced significantly, price distortions remain as a result of sector-specific subsidy policy. For example, the Ministry of Agriculture and Cooperative has been subsidizing fisherman in buying cheaper diesel. The subsidy has led not only to a loss of taxpayer's money, but also a disincentive for the fishermen to be more fuel efficient. The elimination of the subsidy will thus encourage the fishing industry to become more fuel efficient. Should fishermen require government assistance, there are less distortionary and more efficient alternatives. For example, the government may provide cheap credits for renovation of fishing boats or costs incurred in switching to a new occupation, or provide deficiency payments to low-income fishermen, etc.

Stopping price-distorting monitoring practice

As discussed in Chapter 4, a weaker version of the single price policy is currently being implemented in Thailand; oil prices in the provinces within a radius of approximately 200 k.m. from Bangkok are monitored to be the same as those in Bangkok although there is a substantial difference in the cost of transportation. Our study found that if the single price is set optimally as described in Chapter 4, efficiency losses would be small. This is because the consumption share of the distant provinces is relatively small compared to that of Bangkok. However, as these provinces are expanding rapidly, the policy is likely to induce greater losses in the future. Thus, the government should abolish the current distortive price-monitoring practice that seeks to establish uniform prices among stations located in different areas.

7.3 Other Policy Recommendations

Apart from the above recommendations that are specific to oil industries, we propose another recommendation to increase the competitiveness of the Thai industry through consumption of cheaper oil.

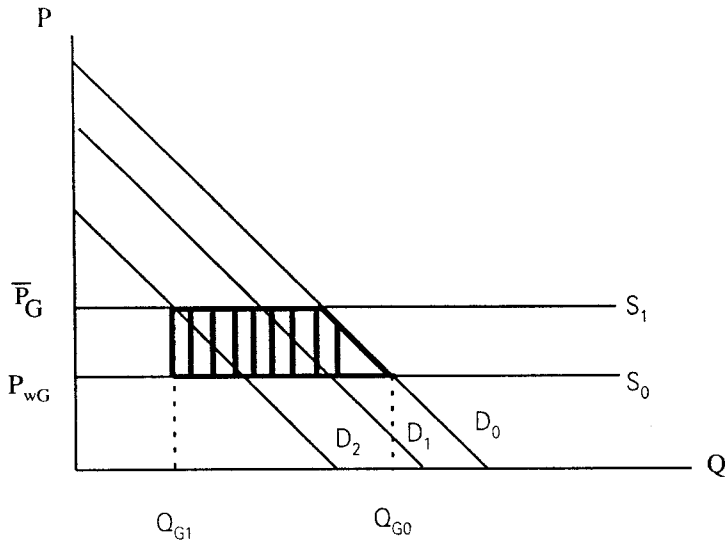
Promoting More Efficient Transportation Modes

Since oil products are important inputs to many economic sectors, reduction in the cost of transportation will result in increasing competitiveness of the Thai economy. Currently, most commodity products including oil are transported largely by road, i.e., by trucks, which is rather inefficient. Alternative mass transportation, e.g., rail and waterway, should be promoted for both people and commodity movements. Thus, the government should consider investing in the infrastructure for mass transportation.

APPENDIX A

Figure A1

Deadweight Loss Measurement

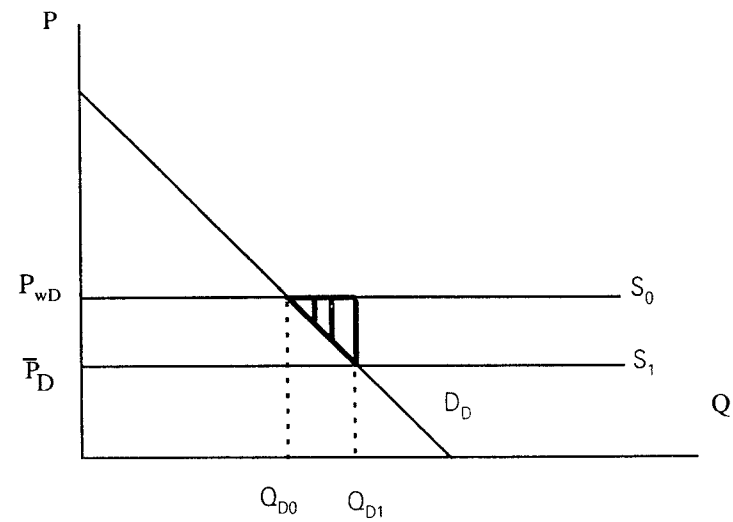


D_0= Original Demand Curve

D_1 and D_2 = New demand curve shifted by a price change in LPG and diesel respectively, due to subsidies from oil fund

S_0 and S_1= original supply curve and new supply curve after imposing tax on gasoline, respectively

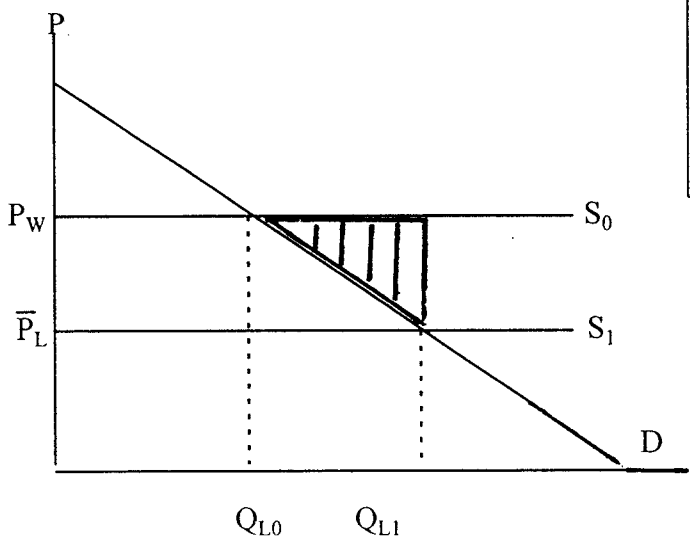
Premium Gasoline



D_D= Demand curve for diesel

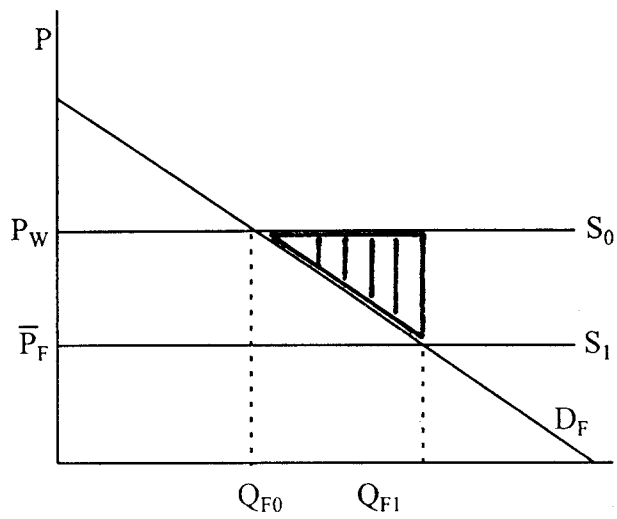
S_0 and S_1 = original supply curve and new supply curve shifted due to a subsidy, respectively

High Speed Diesel



D_L= Demand curve for LPG
S_0 and S_1 = original supply curve and new supply curve shifted due to a subsidy, respectively

LPG



D_F= Demand curve for fuel oil
S_0 and S_1 = original supply curve and new supply curve shifted due to a subsidy, respectively

Fuel Oil

Appendix B

Customer Survey Results

I Basic Information

1. Profession

	Number Interviewed
1. Workers	120
2. Self employed	66
3. Company employee	56
4. Government official	39
5. Farmer	18
6. Student	9
7. None	4
Total	312

2. Type of Vehicles Driven

	Number Interviewed
1. Pickup	143
2. Car	73
3. Motorcycle	51
4. Truck	29
5. Bus	16
Total	312

3. Type of Fuel Used

	Number Interviewed
1. HSD	188
2. ULG	94
3. Super	19
4. Regular	11
Total	312

4. Oil Brand Normally Using

	Number Responded
1. PTT	90
2. SHELL	79
3. CALTEX	47
4. ESSO	26
5. BCP	22
6. BP	17
7. No particular brand	8
8. Q8	7
9. JET	4
10. PC SIAM	3
11. MOBIL	1
12. PT	1
13. Others	7
Total	312

II Factors Affecting Consumer Decision in Selecting Station

1. Oil Price

	Number
1. Most Significant	47
2. Significant	114
3. Not Significant	75
4. Not reply	76
Total	312

2. Oil Product Quality

	Number
1. Most Significant	120
2. Significant	111
3. Not Significant	18
4. Not reply	63
Total	312

3. Service Quality

	Number
1. Most Significant	33
2. Significant	168
3. Not Significant	30
4. Not reply	81
Total	312

4. Brand Loyalty

	Number
1. Most Significant	17
2. Significant	51
3. Not Significant	138
4. Not reply	106
Total	312

5. Convenience

	Number
1. Most Significant	56
2. Significant	113
3. Not Significant	67
4. Not reply	76
Total	312

6. Free Gifts

	Number
1. Most Significant	2
2. Significant	10
3. Not Significant	191
4. Not reply	109
Total	312

7. Clean Rest Rooms

	Number
1. Most Significant	4
2. Significant	120
3. Not Significant	81
4. Not reply	107
Total	**312**

8. Advertisment Appealing

	Number
1. Most Significant	0
2. Significant	25
3. Not Significant	154
4. Not reply	133
Total	**312**

III Frequency in Visiting Retail Stations

(Number of Times per Year)

1. To buy fuel

	Number
1. 1 - 50	28
2. 51 - 150	99
3. 151 - 250	76
4. 256 - 350	12
5. 356 - 450	72
6. More than 450	7
7. Others	18
Total	312

2. To Change Lube Oil

	Number
1. 1 - 12	217
2. More than 12	35
3. Others	60
Total	312

3. To have car washed

	Number
1. 1 - 50	118
2. 51 - 100	51
3. More than 100	17
4. Others	126
Total	312

4. To have tyre / engine fixed

	Number
1. 1 - 12	64
2. More than 12	38
3. Others	210
Total	312

5. To visit convenience store

	Number
1. 1 - 50	38
2. 51 - 100	64
3. 101 - 150	22
4. More than 150	58
4. Others	130
Total	312

6. To have meals in restaurant

	Number
1. 1 - 50	27
2. 51 - 100	49
3. 101 - 150	22
4. More than 150	29
4. Others	185
Total	312

7. To use rest rooms

	Number
1. 1 - 50	26
2. 51 - 100	106
3. 101 - 150	30
4. More than 150	77
4. Others	73
Total	**312**

IV Oil Company Image

1. Best Fuel Quality

	Number
1. PTT	84
2. SHELL	82
3. ESSO	42
4. CALTEX	40
5. BCP	14
6. BP	12
7. Q8	2
8. JET	1
9. PT	1
10. PC SIAM	1
11. Others	14
12. Indifference	19
Total	312

2. Best Service

	Number
1. PTT	78
2. SHELL	62
3. ESSO	39
4. CALTEX	35
5. BCP	31
6. BP	24
7. Q8	4
8. JET	1
9. MOBIL	1
10. PT	1
11. Others	16
12. Indifferent	20
Total	312

3. Look Most Modern / best design

	Number
1. PTT	83
2. SHELL	54
3. BCP	50
4. BP	30
5. CALTEX	28
6. ESSO	25
7. PT	5
8. JET	4
9. Q8	3
10. COSMO	2
11. PC SIAM	2
12. Others	16
13. Indifferent	10
Total	312

4. Clean Rest rooms

	Number
1. PTT	97
2. SHELL	48
3. BP	39
4. BCP	33
5. CALTEX	31
6. ESSO	28
7. PC SIAM	3
8. Q8	2
9. JET	1
10. MOBIL	1
11. COSMO	1
12. PT	1
13. Others	16
14. Indifferent	11
Total	312

5. Modern C-store

	Number
1. PTT	72
2. SHELL	43
3. ESSO	37
4. CALTEX	32
5. BP	28
6. BCP	27
7. Q8	6
8. JET	5
9. PA	2
10. COSMO	1
11. PC SIAM	1
12. Others	22
13. Indifferent	36
Total	312

V Oil Pricing

1. Ever Noticed Price Differential Among Stations?

	Number
1. No	124
2. Yes	188
Total	312

2. Brands Having Relatively High Fuel Prices

	Number
1. SHELL	57
2. ESSO	34
3. CALTEX	30
4. BCP	18
5. PTT	16
6. JET	2
7. BP	1
8. PA	1
9. COSMO	1
10. PT	1
11. Others	151
Total	312

3. Brands Having Relatively Low Fuel Prices

	Number
1. PTT	57
2. BCP	33
3. JET	26
4. ESSO	12
5. SHELL	9
6. CALTEX	9
7. Q8	4
8. PC SIAM	4
9. BP	3
10. MOBIL	2
11. MP	2
12. SUSCO	2
13. COSMO	2
14. TPI	1
15. Others	146
Total	312

4. What are Price differential ?

stg / lt	Number
1. Don't know	141
2. 1 - 25	136
3. 26 - 50	25
4. 56 - 75	5
5. 76 - 100	5
Total	312

5. Ever Try to Find Low Price Stations ?

	Number
1. No	214
2. Yes	90
3. Others	8
Total	312

6. If Yes, how often ?

	Number
1. Almost every filling	46
2. Occasionally	44
3. Every filling	6
4. No reply	216
Total	312

7. Is Oil retailing highly competitive Business ?

	Number
1. Yes, very high	214
2. Reasonably high	81
3. Not high	8
4. Don't know	9
Total	312

VI Effect of Oil Price Deregulation

1. On price level

	Number
1. Make price higher	202
2. No effect	42
3. Do not know	39
4. Make price lower	29
Total	312

2. On price competition

	Number
1. Increase price competition	162
2. Moderate competition	106
3. No competition	24
4. Do not know	20
Total	312

3. Effect on Number of Retail Station

	Number
1. Increase number of station	239
2. No effect	39
3. Do not know	34
Total	312

4. Effect on Oil Quality

	Number
1. Improve oil quality	122
2. No effect	99
3. Do not know	86
4. Lower oil quality	5
Total	312

5. Effect on Station Service

	Number
1. Improve service	245
2. No effect	40
3. Do not know	27
Total	312

6. Effect on New Entries

	Number
1. Stimulate new entries	166
2. Do not know	82
3. No effect	64
Total	312

7. Effect on Oil Consumption Behavior

	Number
1. No change	223
2. Use more oil	70
3. Use less oil	10
4. Others	9
Total	312

8. If Consumers were to choose between free gifts or or 5 satang/litre price reduction without free gifts, what would be thein preference ?

	Number
1. Free gift	46
2. Price reduction	244
3. Indifference	22
Total	312

9. Positive Sides of the Deregulation

	Number
1. Improve services	46
2. Lower oil prices	39
3. Increase competition	32
4. Increase comsumer choices	27
5. Increase member of stations	9
6. Others	159
Total	312

10. Negative Sides of the Deregulation

	Number
1. Make price higher	134
2. Make price fluctuate	16
3. Lower oil quality	14
4. Others	148
Total	312

11. Overall Effect of the Deregulation

	Number
1. Make things better	115
2. Make it worse off	81
3. No change	80
4. Do not know	36
Total	312

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