แรงขับเคลื่อนเศรษฐกิจไทย: การส่งออกและทางเลือก

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บทคัดย่อ

บทวิจัยนี้มีวัตถุประสงค์เพื่อตอบคำถามสำคัญว่าประเทศไทยมีทางเลือกอื่นในการขับเคลื่อนเศรษฐกิจ นอกเหนือจากการส่งออกหรือไม่ โดยในส่วนแรกได้วิเคราะห์ถึงความสำคัญของการส่งออกที่มีต่อเศรษฐกิจไทย จากนั้นจึงประเมินว่าอุปสงค์ภายในประเทศสามารถเป็นแรงขับเคลื่อนเศรษฐกิจไทยทดแทนการส่งออกได้หรือไม่ จากการศึกษาพบว่า ภาคส่งออกสร้างรายได้ให้กับประเทศมากอย่างต่อเนื่อง และเป็นแรงขับเคลื่อนเศรษฐกิจ ที่สำคัญของไทยตั้งแต่ปี 1997 เป็นต้นมา นอกจากนี้ยังพบว่า ในระยะปานกลางและระยะยาวอุปสงค์ภายใน ไม่สามารถเป็นแรงขับเคลื่อนเศรษฐกิจทดแทนการส่งออกได้ เนื่องจากตลาดภายในประเทศมีขนาดเล็ก ดังนั้น ภาคส่งออกยังคงต้องเป็นแรงขับเคลื่อนเศรษฐกิจที่สำคัญของประเทศไทยต่อไป เพราะมีความสำคัญสูง ต่อการลงทุน การจ้างงาน การบริโภคและการเพิ่มผลิตภาพการผลิตของประเทศ อย่างไรก็ตาม จำเป็นต้องส่งเสริม ให้อุปสงค์ภายในประเทศมีความเข้มแข็งเพราะมีบทบาทสำคัญในการพยุงเศรษฐกิจเมื่อประเทศเผชิญวิกฤต จากภายนอก อีกทั้งอุปสงค์ภายในประเทศโดยเฉพาะการลงทุนยังมีศักยภาพที่จะมีบทบาทมากขึ้นเพื่อช่วยกระตุ้น ให้เศรษฐกิจฟื้นตัว และส่งเสริมการเจริญเติบโตของเศรษฐกิจอย่างยั่งยืนต่อไป

บทสรุปผู้บริหาร

วิกฤตเศรษฐกิจโลกส่งผลให้การส่งออกของไทยหดตัวมากอย่างไม่เคยปรากฏโดยเฉพาะในช่วงไตรมาสสุดท้ายของปี 2008 เป็นต้นมา ทำให้เกิดคำถามในกลุ่มนักวิชาการว่า ประเทศไทยควรพึ่งพาการส่งออกเป็นแรงขับเคลื่อนเศรษฐกิจหลักต่อไปหรือไม่เพราะเห็นว่าความเสี่ยงที่เกิดจากการพึ่งพาการส่งออกอยู่ในระดับสูงมากสำหรับเศรษฐกิจขนาดเล็กเช่นไทย ประกอบกับเห็นว่าผลประโยชน์สุทธิที่ประเทศได้รับอาจไม่มากนักเนื่องจากการส่งออกต้องนำเข้าวัตถุดิบในสัดส่วนที่สูง ดังนั้น จึงนำไปสู่แนวคิดที่สนับสนุนให้อุปสงค์ภายในประเทศมีบทบาทในการขับเคลื่อนเศรษฐกิจทดแทนการส่งออก ขณะที่อีกกลุ่มหนึ่งยังคงเห็นว่า ภาคส่งออกสร้างผลประโยชน์ให้กับเศรษฐกิจไทยเป็นอย่างมาก ทั้งในรูปรายได้ การจ้างงาน และการเพิ่มผลิตภาพของประเทศ จึงยังควรมีบทบาทหลักในการขับเคลื่อนเศรษฐกิจไทยในระยะปานกลางและระยะยาวต่อไป

บทวิจัยนี้จึงมุ่งสร้างความชัดเจนในประเด็นดังกล่าวโดยการวิเคราะห์ลักษณะและความสำคัญของการส่งออก และประเมินศักยภาพของอุปสงค์ภายในประเทศในการทำหน้าที่ขับเคลื่อนเศรษฐกิจทดแทนการส่งออก

หลังจากวิกฤตเศรษฐกิจปี 1997 เป็นต้นมา การส่งออกของไทยเพิ่มขึ้นมากอย่างต่อเนื่องด้วยเหตุผลสำคัญ 3 ประการ คือ 1) ประเทศไทยถูกผนวกเข้าเป็นส่วนหนึ่งของเครือข่ายการผลิตระหว่างประเทศ (International Production Networks) ของบรรษัทข้ามชาติโดยเฉพาะการผลิตสินค้าที่ใช้เทคโนโลยีสูง (High-tech) เช่น อิเล็กทรอนิกส์ คอมพิวเตอร์ เครื่องใช้ไฟฟ้า และยานยนต์ 2) การบริโภคที่เพิ่มสูงขึ้นอย่างมากของสหรัฐฯ ในทศวรรษที่ 20 และการเติบโตของกำลังซื้อของผู้บริโภคในตลาดเกิดใหม่ เช่น จีน อินเดีย และตะวันออกกลาง ประกอบกับ 3) ประเทศไทยมีนโยบายการค้าและนโยบายด้านอุตสาหกรรมที่เอื้อต่อการส่งออก

การเข้ามาลงทุนของบรรษัทข้ามชาติในภูมิภาคเอเชียตะวันออกและเอเชียตะวันออกเฉียงใต้เพื่อใช้เป็นฐานการผลิตสินค้า High-tech ทำให้การค้าภายในภูมิภาคของไทยเพิ่มขึ้นอย่างมาก และส่งผลให้สินค้า High-tech กลายเป็นสินค้าส่งออกที่สำคัญของไทย โดยในปี 2008 มีสัดส่วนสูงถึงร้อยละ 62.7 ของการส่งออกทั้งหมด อย่างไรก็ตาม การค้าภายในภูมิภาคส่วนใหญ่เป็นการค้าชิ้นส่วนและวัตถุดิบเพื่อประกอบเป็นสินค้าสำเร็จรูปโดยอุปสงค์ขั้นสุดท้ายยังคงอยู่ที่กลุ่มประเทศ G3

การที่การส่งออกของไทยกระจุกตัวอยู่ในกลุ่มสินค้า High-tech ซึ่งมีความอ่อนไหวต่อรายได้ของประเทศคู่ค้าสูง ทำให้ในช่วงที่เศรษฐกิจของประเทศคู่ค้าขยายตัว การส่งออกของไทยก็จะได้รับประโยชน์สูง แต่ก็ทำให้เศรษฐกิจไทยเปราะบางต่อวัฏจักรเศรษฐกิจขาลงของประเทศคู่ค้าเป็นอย่างมากเช่นกัน

สำหรับการวิเคราะห์ความสำคัญของการส่งออก บทวิจัยนี้ พบว่า การส่งออกสร้างรายได้สุทธิให้กับประเทศมากอย่างต่อเนื่อง โดยมูลค่าเพิ่มของการส่งออกซึ่งสะท้อนรายได้สุทธิที่ประเทศได้รับเพิ่มจากร้อยละ 21 ในปี 1995 เป็นร้อยละ 35.8 ต่อ GDP ในปี 2008 และจากการคำนวณ Contribution to GDP Growth ที่ได้หักการนำเข้าของแต่ละองค์ประกอบด้านอุปสงค์ของ GDP ออกไป เพื่อให้สะท้อนบทบาทที่แท้จริงของการส่งออกสุทธิและอุปสงค์ภายในประเทศสุทธิที่มีต่อเศรษฐกิจ พบว่า การส่งออกเป็นแรงขับเคลื่อนเศรษฐกิจที่สำคัญตั้งแต่ปี 1998 เป็นต้นมา โดยในช่วงปี 1998-2008 อัตราการขยายตัวของ GDP โดยเฉลี่ยอยู่ที่ร้อยละ 3.4 ซึ่งเป็นผลมาจากการขยายตัวของการส่งออกถึงร้อยละ 2.7

นอกจากนั้น การวิเคราะห์ผลกระทบต่อเนื่องของการส่งออกไปยังอุปสงค์ภายในประเทศด้วย Structural Vector Auto Regression พบว่า การเพิ่มขึ้น (ลดลง) ของการส่งออกมีผลต่อการบริโภคและการลงทุนภาคเอกชนเป็นอย่างมาก โดยมีผลสูงสุดภายใน 2 ปีหลังจากการเพิ่มขึ้น (ลดลง) ของการส่งออก อีกทั้ง การส่งออกยังมีบทบาทสำคัญต่อการเจริญเติบโตทางเศรษฐกิจในระยะยาวผ่านการลงทุน การจ้างงาน และการเพิ่มผลิตภาพการผลิตของประเทศ โดยงานวิจัยที่ผ่านมาชี้ว่า อุตสาหกรรมที่ผลิตเพื่อส่งออกมีผลิตภาพมากกว่าอุตสาหกรรมที่ผลิตเพื่อใช้ในประเทศ นอกจากนี้ยังก่อให้เกิดการถ่ายทอดและส่งผ่านเทคโนโลยีไปสู่ภาคเศรษฐกิจอื่น

สำหรับบทบาทของอุปสงค์ภายในประเทศ บทวิจัยนี้ พบว่า ในระยะสั้นอุปสงค์ภายในประเทศควรมีบทบาทมากขึ้นเพื่อช่วยพยุงเศรษฐกิจในภาวะที่ภาคส่งออกเผชิญกับวิกฤต แต่การชดเชยการลดลงของการส่งออกจากวิกฤตเศรษฐกิจด้วยอุปสงค์ภายในประเทศครั้งนี้คงทำได้เพียงระดับหนึ่งเพราะมีข้อจำกัดด้านเสถียรภาพการคลัง

ทั้งนี้ในระยะปานกลางและระยะยาว อุปสงค์ภายในประเทศไม่สามารถเป็นแรงขับเคลื่อนเศรษฐกิจทดแทนการส่งออกได้เพราะตลาดภายในมีขนาดเล็กจากการที่ประชากรมีระดับปานกลางแต่มีรายได้ต่อหัวในระดับค่อนข้างต่ำ จึงทำให้การสร้างรายได้ให้ทัดเทียมกับภาคส่งออกที่ตลาดมีขนาดใหญ่มากเป็นไปได้ยาก นอกจากนั้น การผลิตสินค้า High-tech ที่อยู่ในเครือข่ายการผลิตระหว่างประเทศ (ประมาณร้อยละ 50 ของการส่งออกสินค้า High-tech ของไทยอยู่ในเครือข่ายการผลิตระหว่างประเทศ) จำเป็นต้องมีการผลิตเป็นจำนวนมากเพื่อก่อให้เกิดการประหยัดจากขนาด (Economies of Scale) ซึ่งตลาดภายในประเทศไม่สามารถรองรับได้ นอกจากนั้น จากการที่ภาคส่งออกมีบทบาทสำคัญต่อผลิตภาพของประเทศ ดังนั้น การผลักดันให้อุปสงค์ภายในประเทศเป็นแรงขับเคลื่อนเศรษฐกิจแทนการส่งออกก็อาจกระทบต่อการยกระดับผลิตภาพของประเทศ

อย่างไรก็ตาม อุปสงค์ภายในประเทศโดยเฉพาะการลงทุนภาคเอกชนควรมีบทบาทมากขึ้นเพื่อช่วยผลักดันการขยายตัวของเศรษฐกิจในระยะปานกลางและระยะยาว ดังนั้นจึงควรเน้นการสร้างความเชื่อมั่นทั้งทางการเมืองและเศรษฐกิจ โดยภาครัฐควรลงทุนในโครงสร้างพื้นฐานและ

การศึกษาเพื่อสร้างแรงจูงใจให้การลงทุนภาคเอกชน และส่งเสริมการเจริญเติบโตของเศรษฐกิจ
อย่างยั่งยืนต่อไป

นัยต่อการดำเนินนโยบายที่สำคัญสี่ประการที่ได้จากการศึกษา คือ ประการแรก การส่งออก
ยังคงต้องเป็นแรงขับเคลื่อนเศรษฐกิจที่สำคัญของไทยต่อไป ดังนั้นการเข้าใจลักษณะของวัฏจักร
สินค้าส่งออกที่สำคัญโดยเฉพาะสินค้าในกลุ่ม High-tech ซึ่งมีอิทธิพลต่อการส่งออกมากจึงมี
ประโยชน์ต่อการดำเนินนโยบายรักษาเสถียรภาพทางเศรษฐกิจ

ประการที่สอง จากการที่การค้าของโลกมีความเชื่อมโยงกันมากขึ้น ทำให้วัฏจักรเศรษฐกิจ
ขาลงของประเทศคู่ค้ามีแนวโน้มที่จะสอดคล้องกันมากขึ้น ดังนั้น นอกจากภาครัฐจะต้องมี
มาตรการในการรองรับวิกฤตแล้ว การส่งเสริมให้ผู้ประกอบการและแรงงานให้สามารถปรับตัวต่อ
ผลกระทบที่เกิดขึ้น การพัฒนาระบบสวัสดิการสังคมให้มีประสิทธิภาพมากขึ้นจึงจำเป็นกลไก
สำคัญที่จะช่วยลดผลกระทบจากวิกฤตภายนอกต่อผู้ประกอบการและแรงงานในภาคการส่งออก

ประการที่สาม รัฐบาลควรส่งเสริมการยกระดับผลิตภาพของภาคการผลิตเพื่อตลาด
ภายในประเทศ เพื่อเสริมสร้างให้อุปสงค์ภายในประเทศมีความเข้มแข็ง โดยเฉพาะการพัฒนาทักษะ
ของผู้ประกอบการ รวมทั้งการพัฒนาคุณภาพการศึกษาและโครงสร้างพื้นฐานของประเทศซึ่งจะ
เป็นประโยชน์ต่อทั้งภาคการผลิตเพื่อตลาดภายในประเทศและภาคส่งออก

ประการสุดท้าย เนื่องจากการส่งออกยังคงต้องเป็นแรงขับเคลื่อนหลักของเศรษฐกิจไทย
ดังนั้น ภาครัฐควรมีนโยบายสนับสนุนการส่งออกต่อไป ในขณะเดียวกัน ภาครัฐจำเป็นต้อง
เสริมสร้างอุปสงค์ภายในประเทศให้เข้มแข็งอย่างค่อยเป็นค่อยไป เพื่อให้เศรษฐกิจไทยเจริญเติบโต
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Is There an Alternative to Export-led Growth for Thailand?

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*The views expressed in this paper are those of the authors
and do not necessarily represent those of the Bank of Thailand.*

Abstract

To answer the question of whether there is an alternative to export-led growth in Thailand, this study investigates the importance of exports to the Thai economy followed by the assessment about the potential of domestic demand to replace exports as the main engine for economic growth. It is found that the export sector has been the significant provider of income for the economy and the most important engine of growth since 1997. Due to the small domestic market, domestic demand would not be able to replace exports as the superior engine in the medium and long term Besides, the Thai economy will still need to depend on the export sector for investment, employment and particularly productivity improvement. However, strengthening domestic demand would be crucial for the economy as 1) it would need to perform the important role as a buffer against negative foreign demand shocks and 2) there is the need to expand domestic demand especially investment to help ensure economic recovery as well as achieve sustainable long term growth.

Executive summary

The severe export contraction since the last quarter of 2008 has led to doubts being raised by some economists whether Thailand should continue to rely on exports as the main growth engine. The main argument is that the export-led growth strategy has exposed the economy to external demand shocks that could be too massive for a small open economy such as Thailand. In addition, net benefits of exports are believed to be not sizable due to high import content of Thai exports. Hence, it has been proposed that Thailand should switch from export-led growth to domestic demand-led growth policy.

This study attempts to analyze the possibility of the above proposal by investigating the characteristics and importance of exports followed by the assessment of the potential of domestic demand to replace exports as the main engine of economic growth.

Since the crisis in 1997, Thai exports have risen significantly as a result of 1) Thailand's trade and industrial policies that have been geared towards export promotion, 2) Thailand has been increasingly integrated as part of Multinational corporations' (MNCs) International Production Networks (IPNs) of high-tech products and 3) a consumption boom in the US in the 2000s and rising opportunities in the new markets such as China, India, and the Middle East.

In 2008, Thai high-tech exports accounted for as high as 62.7 percent of total exports. Even though Thailand's intra-region trade has increased substantially due to the establishment of IPNs in the East and Southeast Asia, the most important final market of Thai exports has still been the G3.

We find that relying on high-tech exports has made the economy vulnerable to the cyclical downturn of the trading partners. This is because this type of products possesses a very high elasticity with respect to trading partners' income which led to not only fast rising demand during the upturn of the trading partners' economies but also sharp contracting demand during their economic decline.

However, our findings about the benefits of Thai exports show that the export sector has generated substantial and increasing net income for the Thai economy. Net income generated by export production as represented by the value added (VA) of export goods has increased continuously from 21 percent in 1995 to 35.8 percent of GDP in 2008. In addition, the appropriate measurement of the genuine contributions of exports and domestic demand net of their import contents we propose in this study clearly demonstrates that the export sector has been the most

important engine of growth since 1998. While GDP grew on an average of 3.4 percent during 1998 to 2008, this direct impact in terms of the contribution of exports net of their import contents to GDP growth was estimated to be as high as an average of 2.7 percent per year.

In addition, our Structural Vector Auto Regression (SVAR) analysis shows that the export activities have also had substantial indirect impact on domestic demand including private consumption and private investment over time. The peak impact on both private consumption and private investment is around the second and third year after the change in exports.

Besides, the export sector also has the profound role for long-term economic growth in terms of the main capital accumulator, employment creator, and productivity booster for the economy. In particular, various earlier research works have pointed out that the level of productivity of the export sector is higher than the non-export sector and its productivity spillovers to other sectors are an essential source of productivity growth for the economy.

As for the domestic demand, we assess that, in the short-term, it should act as a buffer to help alleviate the impact from the current global crisis. Enhancing domestic demand in the short term needs to be mainly in the form of public spending. However, with the extensive direct and indirect linkages of export production with different sectors in the economy, an enormous size of domestic demand is required to totally counter the considerable export contraction. Nonetheless, increasing public consumption and investment has a certain limit up to which fiscal sustainability can still be ensured. Hence, the public sector effort would be able to help cushion the economy from the consequence of export contraction only to a certain degree since the decline in exports has been very substantial this time.

Regarding the role of domestic demand in driving growth in the medium and long terms, we assess that the domestic market would be too small in terms of population and per capita income to replace demand from the foreign markets. In particular, most of the production of high-tech products in the IPNs (roughly half of high-tech exports) needs a massive size of production to achieve economies of scale and requires a global scale of demand in which the domestic market can not substitute. In addition, the export sector is the main source of productivity of the Thai economy. Switching from pursuing the foreign markets to the domestic market would undermine productivity enhancement at the national level.

However, fostering domestic demand, especially investment, would be crucial for the economy as 1) domestic demand would need to assume the essential role of being a buffer against negative foreign demand shocks during the period of major crises abroad and 2) there is the need to expand

domestic demand, especially private investment to help achieve the sustainable medium and long term growth for Thailand. The important factors that need to be fostered for an expansion of private investment include public investment in infrastructure and human capital as well as an enhancement of investment climate in terms of political and economic stability.

Our study points out the following important policy recommendations. Firstly, better understanding about the characteristics of the product cycle of high-tech exports will be crucial for macro policy management in maintaining economic stability. The reason is that this group of exports will continue to be the main income generator for the economy but also expose the economy to the cyclical downturns of the trading partners' economies.

Secondly, with the rising level of global trade integration, it is likely that the trading partners' economic downturn would continue to be highly synchronized. Hence, in addition to ensuring a fiscal space for government stimulus policy, it is important to enhance resilience of firms and workers in response to negative external demand shocks. The ability of firms to adjust costs and production during the period of adverse shocks, worker's adeptness in learning new skills, labor market flexibility, as well as an adequate and efficient social safety net system would be crucial as a shock absorber for the economy in the increasingly integrated world.

Thirdly, productivity of domestic market-oriented firms needs to be enhanced to help strengthen domestic demand. The government could play a vital role in enhancing skills of domestic market oriented firms as well as fostering human capital development and provide physical infrastructure that indeed would benefit both the export and non-export sectors.

Lastly, as exports will still need to assume a crucial driving role for Thai economic growth, policies should continue to support a further export expansion. Nonetheless, the government should emphasize the efforts to foster the gradually increasing role of domestic demand as the long-term sustainable growth will depend critically on the strength of domestic demand.

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I. Introduction

Thailand has relied on export-led growth as the main economic development strategy since mid 1980s. Under this strategy, the ratio of exports to GDP rose vastly from 24.2 percent in 1985, the year of the Plaza Accord agreement, to 72.0 in 2008. (Picture 1.1) The almost 10-fold increase in exports during the above period has been cited as the main contribution to the shift from an agricultural-based economy to an industrial-based economy. Therefore, it is believed that the Thai economy has benefited immensely from the export-led growth strategy as evidenced by the contribution of the export sector to the rising income.
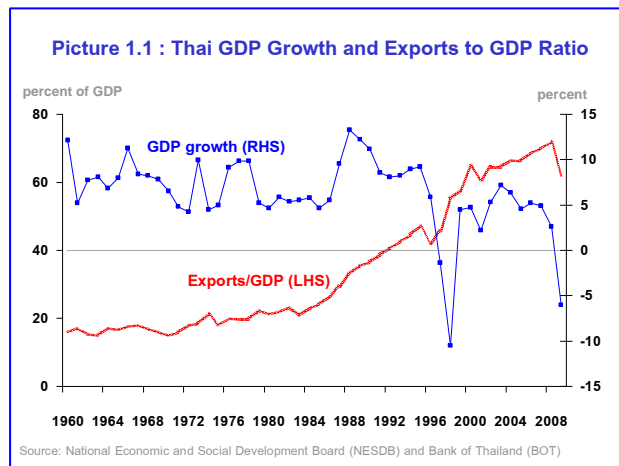
Picture 1.1 : Thai GDP Growth and Exports to GDP Ratio

percent of GDP — percent

GDP growth (RHS)

Exports/GDP (LHS)

1960 1964 1968 1972 1976 1980 1984 1988 1992 1996 2000 2004 2008

Source: National Economic and Social Development Board (NESDB) and Bank of Thailand (BOT)

However, the increase in exports implies that the Thai economy has become more dependent on trading partners' demand. This rising dependency on external demand has implicitly exposed the economy to numerous cyclical downturns of the trading partners's demand. This has been evidenced by the decline in GDP due to export contractions during the oil crises in 1973 and 1979, the Dot-com crisis in 2001, and the current global crisis. In the current global meltdown, world GDP growth decreased sharply from 4 percent in 2007Q3 to -3.4 percent in 2009Q2 on the year-on-year
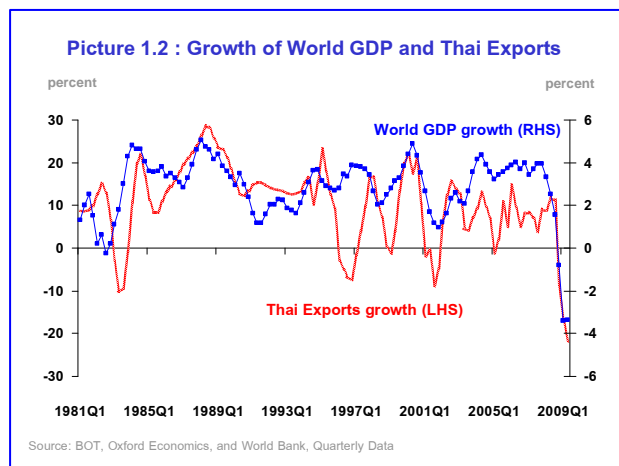
Picture 1.2 : Growth of World GDP and Thai Exports

percent — percent

World GDP growth (RHS)

Thai Exports growth (LHS)

1981Q1 1985Q1 1989Q1 1993Q1 1997Q1 2001Q1 2005Q1 2009Q1

Source: BOT, Oxford Economics, and World Bank, Quarterly Data

basis, leading to the contraction of Thai exports by as much as 20 percent during the period 2008Q4 - 2009Q2. Consequently, the Thai GDP significantly declined by as highly as 6.0 percent in the first half of 2009. (See Picture1.2)

The sharp decline in exports has rendered doubts by some economists whether Thailand should continue to rely on exports as the main growth engine for the economy going forward.[1] They argue that the export-led growth strategy has exposed the economy to external demand shocks that could be too massive for a small open economy such as Thailand. They believe that policy makers should consider reducing the role of exports and propose that the role of domestic demand should surpass that of exports. Their additional argument is that the net benefits of exports have not likely been sizable due to high import contents of Thai exports.

On the contrary, a number of economists still believe that exports are crucial for the Thai economy as they have become the main thrusting force along with the industrialization process. They point out that Thai exports have been the main source of income, employment creation, productivity enhancement, as well as technological transfers for more than two decades. It is also believed that expansion of consumption and investment would have been much lower, had exports not been a growth engine for the economy.

This study aims to shed light on the above arguments by answering the following important questions. First, why has Thai exports been hit so

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[1] Indeed, prior to the significant export decline and economic downturn in Thailand since the last quarter of 2008, there had also been some anticipation that the Asian economies might be able to "decouple" from the global economic recession. Some economists believed that it could be possible that the Asian economies could have escaped from the adverse consequences from the recession in the G3 through stimulating domestic and regional demand.

severely by the current global economic crisis? Second, how have Thai exports contributed to economic growth? And, third, can domestic demand become an alternative to exports as the main growth engine for Thailand in the medium- and long-term future?

To answer these questions, this paper is organized into 5 parts. After an introduction in Part I, we discuss the development of Thai exports over the past two decades and examine why Thai exports were harshly affected by the global economic crisis in Part II. Part III investigates the benefits that exports have provided to the economy both directly and indirectly, especially in terms of values added and employment created by export activities. The role of exports in inducing domestic consumption and investment is also examined in this Part. The potential of domestic demand as the growth engine for the medium and long terms is studied in Part IV. Part V concludes the studies and gives policy recommendations regarding the role of exports and domestic demand in propelling sustainable economic growth.

II. Development of Thai Exports and the Recent Crisis Experience

To provide a necessary background for the investigation about the contributions of exports to the economy in Part III, this part discusses an overview of the development of Thai exports including an evolution and the structure of Thai exports as well as the experience during the current global crisis episode.

II.1 Evolution of Thai Exports

As a reflection of Thailand's increased integration into the world economy, Thai exports started to increase significantly and occupied a main pilot seat for Thailand's economic growth in the middle of 1980s. Since then, they have not only risen substantially but also changed considerably in terms of the composition of products and markets. The drastic evolution

has largely been a result of both trade and industrial policies as well as the changing patterns of international trade and foreign direct investment over the past two decades.

From subscribing to import substitution during 1960s to the early 1980s to shield infantile domestic industries from foreign competition, the trade policy regime was clearly shifted to export promotion in the mid 1980s following the fifth National Economic and Social Development Plan (1982-1986).[2] The highlight of the policy was on the investment promotion regime through tariff exemption by the Board of Investment (BOI) on imported raw materials for export-oriented companies.[3] The commitment to private-led industrialization was also affirmed and the investment climate was enhanced through the continuation of investment promotion policy from various successive governments and the overall economic stability. In addition, public infrastructure investment was also a priority in the national development agenda.

Meanwhile, in the mid 1980s, the unrelentingly high and chronic current account deficit problem in the US prompted the US government to coerce the Japanese government to sign the Plaza Accord Agreement.[4] The following sharp appreciation of the Japanese Yen as well as appreciation of the currencies of Newly Industrialized Economies (NIEs) particularly

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[2] Export promotion policy was initiated in 1972 but it did not succeed as the economy suffered from the two oil crises in 1973 and 1979. See Akrasanee, Dapice, and Flatters(1991) for an assessment about Thai export development during the early 1990s.

[3] See Jongwanich and Kohpaiboon(2008) for details about the BOI exemptions.

[4] In the agreement, Japan and Germany agreed to let their currencies appreciate by intervening in the foreign exchange markets to help the US emerge from the recession in the early 1980s.

Taiwan and Hong Kong[5] served as an important force for the first wave of rising Thai exports.[6] This was because the labor intensive industries in Japan and the NIEs suffered from the declining price competitiveness and began to shift their productions to the cheaper-labor economies in Southeast Asia.

The inflows of these FDIs were a cornerstone that led to a surge in Thai exports during 1986 to 1994 as shown in Picture 2.1. As the main motive of these foreign investments was to take advantage of the lower labor costs, Thailand's International trade still followed a North-South pattern, exporting labor-intensive manufactured goods to developed economies and importing capital goods and capital-intensive manufactured goods.
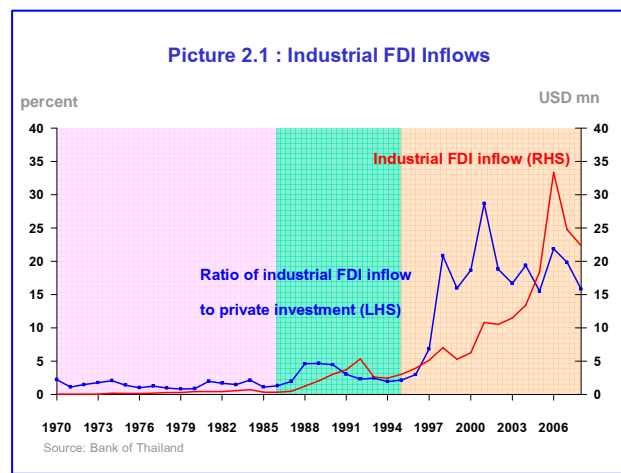
Picture 2.1 : Industrial FDI Inflows

percent   USD mn

Industrial FDI inflow (RHS)

Ratio of industrial FDI inflow to private investment (LHS)

1970 1973 1976 1979 1982 1985 1988 1991 1994 1997 2000 2003 2006

Source: Bank of Thailand

However, since the beginning of the 1990s, the new pattern of trade and investment in the form of "International Production Networks" (IPNs) by Multinational Corporations (MNCs)[7] has emerged and drastically

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[5] Taiwan was the most prominent foreign direct investors during the initial period while FDI from Hong Kong was also prompted subsequently by the rising concerns prior to the return of Hong Kong governing from the UK to China

[6] The additional factor was the devaluation of the Thai baht in 1984 to raise price competitiveness and help stimulate the economy from an abrupt slowdown during the global oil crisis in 1983. It also continued to be pegged to the US dollars more tightly than the currencies of the NIEs in the subsequent period.

[7] International production networks refer to the model of industrial production in which production processes are divided into separate production blocks. In this model, firms choose to shift the components of the final product to the most suitable locations for each process to minimize the total production cost. However, it has to take into account the cost of "service links" such as cost of transportation, logistic, communication, coordination and other transactions. The sophisticated IPNs have expanded throughout East and Southeast Asia since the 1990s as the cost of service link has

contributed to the performance of Thai exports and economic growth. Realizing the potential and capabilities of Thai manufacturing suppliers to work collaboratively in producing and altering components of high-technology products to fit the specifications as well as the relative abundance of skilled workers in the high-tech assembly lines, the MNCs have increased their investment in Thailand especially in the high-tech manufacturing industries such as electronics and automobiles as part of their IPNs in the East and Southeast regions. As a result, FDI inflows into Thailand during 1995 to 2008 increased by more than four times of those during 1986 to 1994 and the significant increase was in the machinery and transport equipment and the electrical appliance groups as shown in Picture 2.2.

Picture 2.2 : Share of FDI Components

Source: Bank of Thailand

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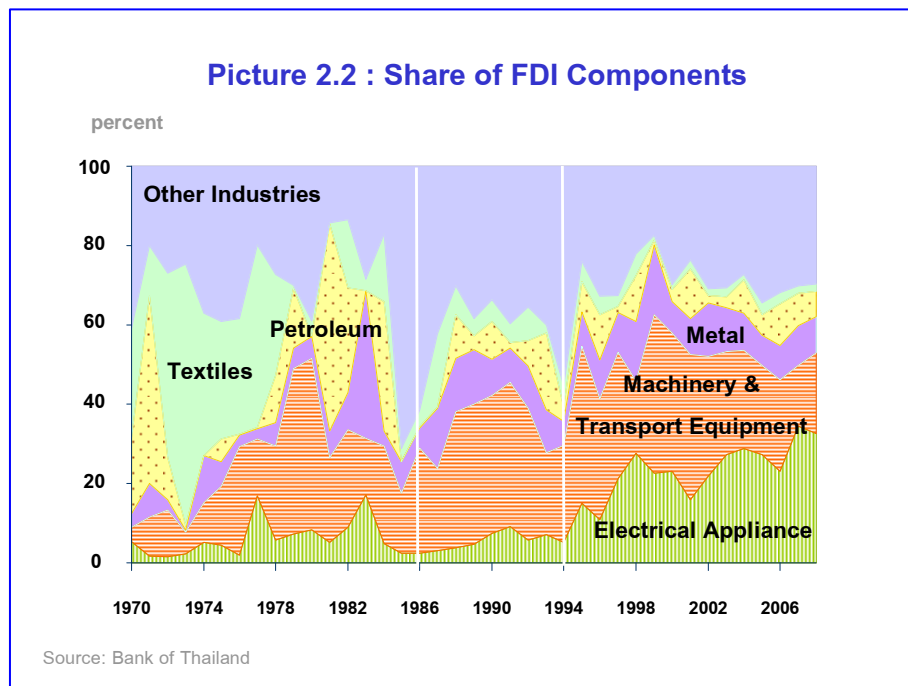
declined significantly due to the advancement of technology particularly in the area of information technology and logistics, trade liberalization, as well as liberalization of the domestic regulatory measures. (See Kuroiwa and Heng (2008))

Accordingly, Thailand's exports to Asia8[8] have increased significantly since 2002 and exceeded exports to the G3 since 2007 as depicted in Picture 2.3. Rising exports to Asia 8 due to the establishment of IPNs has been in both the forms of vertical integration with more advanced regional economies (Hong Kong, Singapore, South Korea, and Taiwan) and horizontal integration with regional economies at the similar levels of development (China, Malaysia, Philippines, and Indonesia) as demonstrated by Thai high-tech exports to these two groups in Picture 2.4.

Picture 2.3: Thai Exports to Asia8 and G3

Source: Customs Department and authors' calculations
Asia8 include China, Hong Kong, Indonesia, South Korea, Malaysia, Philippines, Singapore, and Taiwan
G3 include US, Japan, and Euro Area

Picture 2.4: Thai High-tech Exports to Asia8

Source: Customs Department and authors' calculations
ASEAN include Indonesia, Malaysia, and Philippines
NIEs include Hong Kong, South Korea, Singapore and Taiwan

In addition to the IPN formation of the MNCs, the Thai export sector has also benefited vastly from the rising US consumption especially

Picture 2.5 : Value of Thai Exports

Source: Customs Department
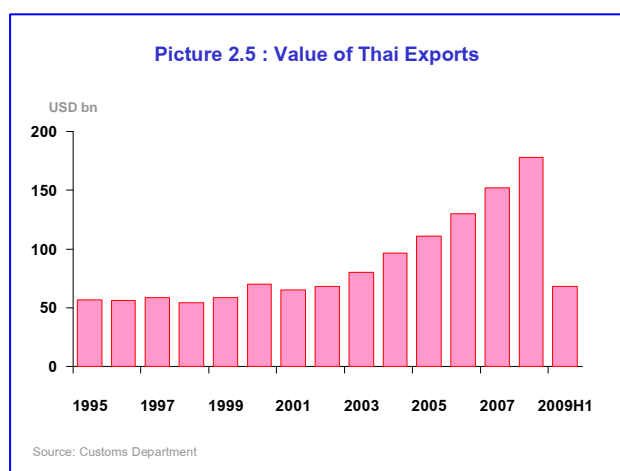
of durable goods during the period of low interest rate after the Dot-com crisis in 2001, the opening up to international trade of large developing economies such as China and India as well as the establishments of multilateral

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[8] Asia8 includes Hong Kong, Singapore, South Korea, Taiwan, China, Malaysia, Philippines, and Indonesia. Where as G3 include the United States, EU (12) and Japan

and bilateral free trade agreements over the past decade with some trade creation partners.[9] As a result of these three major factors, Thai exports rose from 68.0 billion US dollars in 2002 to peak at 177.8 billion US dollars in 2008 at a historic speed of 261 percent over just 6 years. (See Picture 2.5) In fact, these factors have reinforced each other as the rising US durable consumption led to increasing demand from the IPNs in Asia while China has been playing an increasing role as the center of the Asian IPNs.

II.2 Structure of Thai Exports

The structure of Thai exports in terms of product and market composition has changed quite considerably over the past two decades mostly due to the aforementioned changing patterns of trade and foreign direct investment and the increasing opportunities in the new markets.

Composition of Thai export products

Thai manufacturing products have taken over agricultural products as the main exporting component of Thai exports since 1985. They have increased from 41 percent in 1985 to approximately 90 percent of total exports in 2008 whereas the agricultural products have continuously declined from roughly 40 to 10 percent for the same period.

Currently, Thai exports are relatively more diverse compared with exports of several other emerging economies. However, within the four groups of Thai exports, high-technology, labor intensive, resource based, and others, high-tech exports have had the largest share, accounting for over

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[9] As of August 2009, Thailand has established 16 free trade agreements while 5 agreements have already been effective.
See http://www.thaifta.com/ThaiFTA/Portals/0/ftaprog_aug52.pdf for details. (The agreements that have significantly facilitated rising trade with the counterparts include ASEAN-China and Thailand-Australia)

50 percent of total exports since 1997.[10] (See Table 2.1) The share of this group peaked at 62.8 percent on average after dot-com crisis during 2002 to 2008 compared with those of labor and resource intensive groups that were 9.5 and 10.5 in the same period. High-tech exports had the major role in shifting the level of total exports up from an average of 56.9 billion US dollars pre-Asian crisis during 1995 to 1997 to an average of 116.3 billion US dollars after the dot-com crisis. They continually made substantial contributions to export growth averaging at 16.8 percent per year during that period as depicted in Picture 2.6. No other types of export products have ever made such an exorbitant role in lifting the level of Thai exports.

Picture 2.6 : Export Product Contribution to Export Growth

Source: Customs Department and authors' calculations
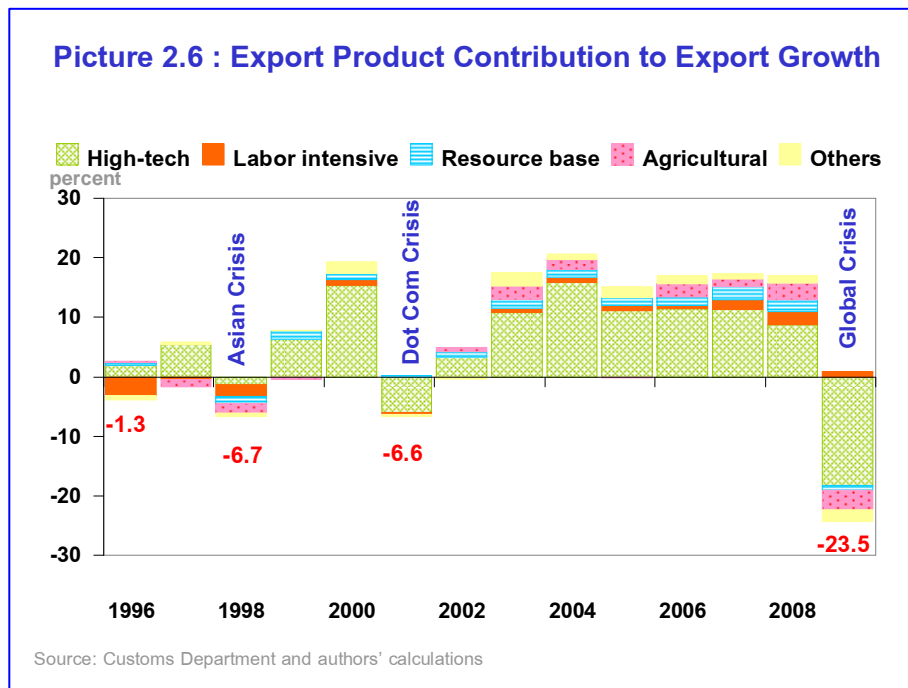
Looking more closely at the composition of high-tech exports reveals that roughly half of the high-tech exports or one third of Thai exports have been concentrated in 4 kinds of products namely computers and parts, integrated circuits (ICs) and parts, electrical appliances, and automobiles and parts. (See Table 2.1) Most of the exports of the first two items have been

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[10] Classified by the Data Management Group, Bank of Thailand using information about types of factors of production in each product's production process mainly from the BOT's firm survey.

in the form of trade in components by the MNCs who have established the IPNs in Thailand and the other regional economies.

Table 2.1 Product Structure of Thai Exports

	Pre-crisis (1995-1997)	Asian Crisis (1998)	Post Asian crisis (1999-2001)	Post Dot-com crisis (2002-2008)	Global Crisis (H12009)
Average value of exports (Million dollar)	56,915.7	54,332.8	64,382.6	116,328.6	68,200.2
Share of total exports (Percent)					
Manufacturing Product	**82.3**	**82.8**	**85.3**	**87.5**	**89.2**
High technology group	**49.3**	**54.7**	**58.6**	**62.8**	**58.8**
- Computers and parts	11.1	14.2	12.5	10.1	9.0
- Vehicle and parts	1.4	2.4	3.8	7.4	7.5
- Electrical apparance	7.7	7.4	7.4	7.7	6.8
- ICs and parts	4.2	4.2	5.7	5.0	4.0
Finish goods*	8.1	8.7	9.9	12.4	11.5
Parts*	16.2	19.4	19.4	17.8	15.7
- Other high technology products	24.9	26.5	29.2	32.6	31.5
Labor intensive group	**17.4**	**14.6**	**12.8**	**9.5**	**12.4**
- Setting Jewelry	3.9	3.3	2.8	3.4	7.7
- Garment	6.1	5.5	4.6	2.6	1.9
- Other labor intensive products	7.4	5.8	5.4	3.5	2.9
Resource base group	**11.6**	**11.0**	**11.1**	**10.5**	**12.1**
- Prepared food	1.2	1.2	2.3	2.7	3.4
- Rubber product	1.4	1.6	1.5	2.1	2.3
- Canned food	2.8	3.3	2.0	1.4	1.7
- Other resource base products	6.2	4.9	5.2	4.4	4.7
Other manufacturing products	**3.9**	**2.4**	**2.8**	**4.6**	**5.8**
Agriculture Products	11.0	9.2	7.5	8.1	8.0
Others (Fishery, forest, mining and others)	6.7	8.1	7.3	4.4	2.8
Growth of total exports (Percent)					
Total exports	1.4	-6.7	6.6	24.7	-23.5
Manufacturing Product	1.9	-6.9	7.8	26.0	-22.3
High technology group	7.8	-2.5	9.2	27.7	-28.9
Labor intensive group	-9.5	-12.6	1.5	14.0	9.4
Resource base group	1.9	-10.6	7.7	22.0	-8.0
Other manufacturing products	-9.0	-35.1	13.4	61.7	-23.2
Agriculture Products	-3.8	-15.6	-1.4	33.6	-34.5
Others (Fishery, forest, mining and others)	4.4	8.2	3.5	1.5	-23.2

Note : *1) finish goods include vehicles and electrical appliances

*2) parts include computers and parts, integrated circuits and parts , and vehicles parts

Source : Customs Department, complied by Bank of Thailand and calculated by authors.

Thai export markets

Thai exports have been increasingly more diversified in terms of markets. However, the major trading partners are still in the two main markets: the G3 and Asia 8. Exports to these two major groups accounted for 68.2 percent of total exports in 2008.

Although exports to the G3 have increased roughly twice since the Asian crisis in 1997, the share of exports to the G3 in total exports have

declined significantly from the peak at 49.3 percent in 1998 to 31.8 percent

Picture 2.7 : Markets of Thai Exports

Source: Customs Department and authors' calculations
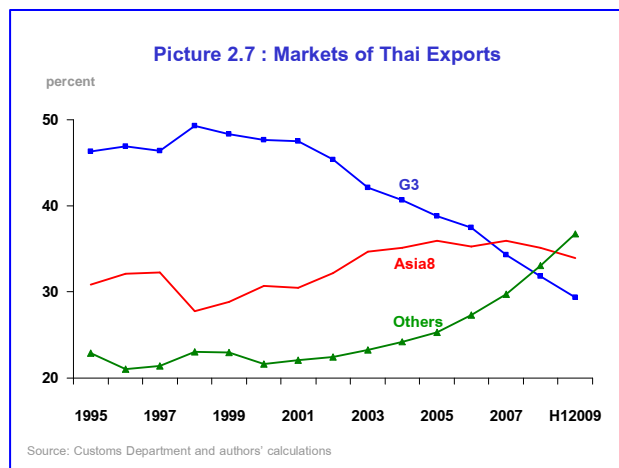
in 2008. The reason is that exports to Asia 8 as well as the other markets outside the two major groups have increased more considerably than those to the G3. (See Picture 2.7)

Exports to Asia 8 have quadrupled since the Asian crisis while the share has increased from 27.8 percent in 1998 to 35.1 percent in 2008. The most drastic rise has been the case of exports to China which increased by 9.2 times over the above period, rendering the share of 9.1 percent in total exports in 2008.

The other rapid increase is the case of exports to the non-G3 and Asia 8 which grew by as much as 6.7 times over the above period with the share rising from 12 percent to 23 percent of total exports. The important markets in this group include Vietnam and India from their opening up to foreign trade and investment since 2000 and 2003 respectively, Australia from the Australia-Thai free trade agreement established in 2005, and the Middle East from its rising oil revenue during 2003 to 2008.

The changing relative importance of different export markets has been chiefly due to the rising role of high-tech exports influenced by MNC activities. From separating the above major high-tech exports into exports of finished products and exports of components, two striking patterns can be observed. As shown in Pictures 2.8 and 2.9. First, the fast rising share of exports of high-tech finished products (finished vehicles and electrical appliance are the main products in this group) was due to the exports to the markets outside G3 and Asia 8 as a result of their fast rising purchasing power, whereas the share to the G3 has declined significantly since around

2002. Second, component exports to Asia 8 (ICs and parts, computers and parts, and vehicle parts are the main products) have increased significantly and exceeded those to G3 since 2002 as the increasing number of IPNs have been established and China has taken a rapidly rising role in the IPNs with the regional economies.

Picture 2.8 : Markets of Finished Vehicles and Electrical Appliances

Source: Customs Department and authors' calculations

Picture 2.9 : Markets of ICs and parts, computer and parts, and vehicle parts

Source: Customs Department and authors' calculations
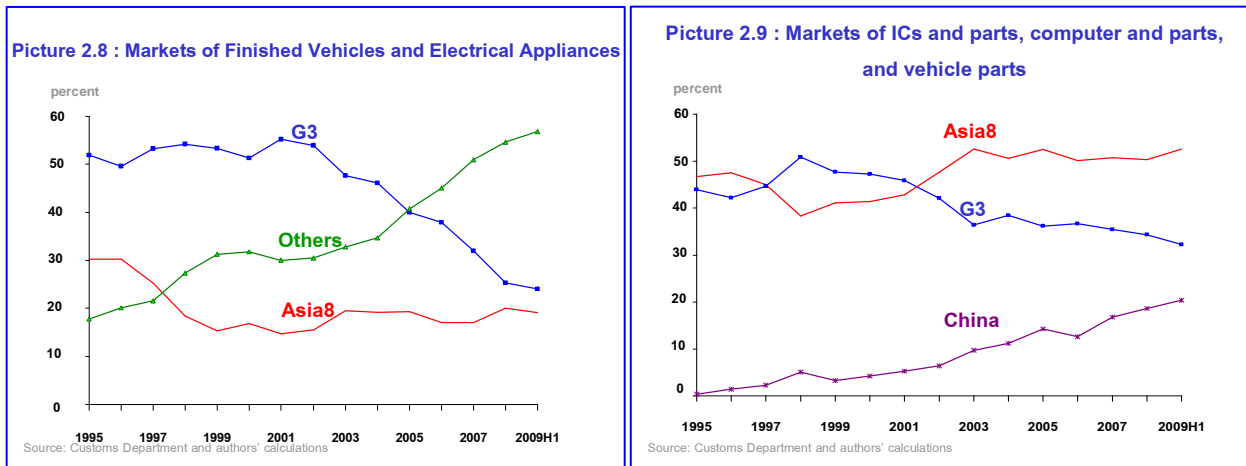
However, it is crucial to point out that the G3 economies continue to be the main market for the final products. The latest ADB study in 2007 estimated that the G3 market accounted for 61.7 percent of Asian exports of final products whereas about 36 percent of trade in East and Southeast Asia was derived from the final demand in the G3.

<u>The Experience of Thai Exports during the Current Crisis Episode</u>

For the past 9 months (November, 2008 to July, 2009), as a result of the severe global crisis, Thai exports have recorded the most significant decline in history at almost 20 percent on the year–on-year basis. The seemingly common question that needs a clear answer for further policy direction pertains to what explains this historically drastic decline of Thai exports. This study assesses that there are two main explanations to this substantial export contraction.

First, this episode of global economic crisis has led to the most drastic global trade contraction historically. In particular, its adverse effects on the volume of global trade have been significantly more pronounced than during the early stage of the great depression as depicted in Picture 2.10. This is because the rapidly increasing global trade integration for the past two decades has extensively exposed open economies to business cycle fluctuations of their trading partners. As a result, Thai exports have been more significantly affected by this current world-wide recession than by the other past external shocks.

Picture 2.10 Volume of World Trade during the Great Depression and the Current Global Crisis

Source: Barry Eichengreen, Kevin O'Rourke (2009), and League of Nations Monthly Bulletin of Statistics
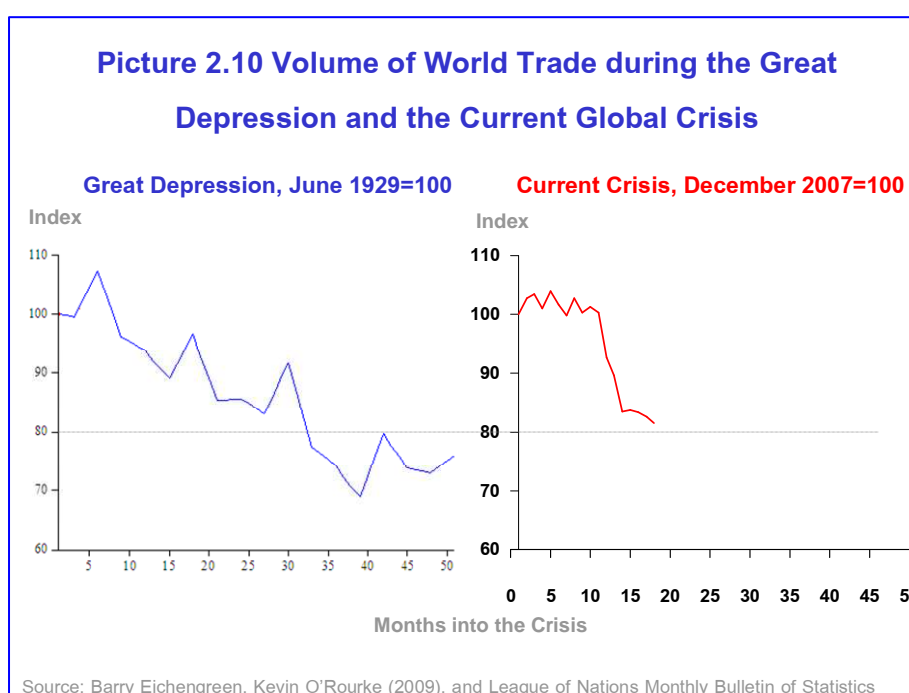
Second, Thai exports have been more vulnerable to the business cycle fluctuations of the trading partners as high-tech exports, the biggest component of Thai exports, are highly sensitive to changing trading partners' income. To prove this, we investigated the size of the elasticity of total export volume with respect to trading partners' GDP together with those different groups of exports, namely high-tech, labor intensive, resource based, as well as agricultural exports. The Error-correction model was employed to find out their long-run and short-run income elasticity

using the data between 2001 Q1 and 2009 Q1. [11] (See Appendix A for the methodology)

The results of this econometric investigation show that both the long-run and short-run income elasticities of high-tech exports are higher than those of labor intensive, resource based, as well as agricultural exports as depicted in Table 2.3. In particular, the short-run income elasticity of high-tech exports is at a souring level of 6.7. As high-tech exports have the largest share in total exports, the short-run income elasticity of total exports also stands at a very high level of 5.1. With the very high short-term income elasticity of exports, exports would rise sharply as trading partners' GDP grows and fall considerably as trading partners' GDP declines.[12]

From the recent observation, high-tech exports declined drastically by 24.0 percent and were also the major contributor to the huge export contraction between 2008 Q4 to 2009Q2 as shown in Table 2.2.   Hence, even though the high income elasticity of high-tech exports was an important factor that propelled rising exports during the upturn of the global economy especially during 2002 to 2008, it has also made Thai exports vulnerable to its downturn. Hence, this group of products has made substantial contributions to Thai exports as well as exposed the economy to potentially large external demand shocks.

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[11] The dependent variables in the model are volumes of total, high-tech, labor intensive, and resource based exports, the independent variables are trading partners' GDP and nominal effective exchange rate (NEER) where trading partners include G3, UK and Asia8. All the variables are in the logarithmic form.

[12] It should also be noted that an adjustment of high-tech exports back to the long-run path would likely take more time than agricultural and resource based exports as indicated by the lower value of the coefficient of its Errors Correction term.

Table 2.2 Elasticities of Thai Exports

	Total	Agricultural	Manufacturing		
			High-tech	Labor intensive [a]	Resource base
%Share in total exports in 2000-2008	100	8	62	10	10
Long-run					
TPGDP	2.08***	0.69***	2.65***	0.51***	1.66***
REER	-0.38**	-0.54*	-0.46*	-0.10	-0.02
Short-run					
ΔTPGDP	5.11***	3.11**	6.68***	2.41***	1.95*
ΔREER	-0.82***	-0.75	-1.08***	-0.38	-0.62
ECM_{t-1}	-0.39***	-0.47***	-0.30*	-0.22***	-0.60***

Source: BOT and authors' calculations

Note: ***, ** and * denote significant at 1%, 5% and 10% confidence

[a] Exclude exports of gold (the export price index of labor intensive products excluding gold is not available; however, we use the export price index of labor intensive products to calculate the volume of labor intensive exports as golds account for only 1.9% in the basket of labor-intensive exports)

To summarize, Thai exports have risen significantly for the past two decades as a result of Thailand's trade and industrial policies as well as the changing patterns of international trade and foreign direct investment. The most important factor behind the rising exports, since 1990s, has been the new trade and investment policy influenced by the MNCs who have increasingly incorporated in Thailand as a part of their IPNs of high-tech products. The rising opportunities in the new markets and an enlargement of opportunities in some existing markets have been a major additional factor that led to rapidly rising high-tech and the overall exports since the early 2000s. However, high-tech exports have been highly sensitive to

trading partners' income, implying that they have helped generate substantial export income during the trading partners' economic upturn but also led to increasing vulnerability to the downturn of trading partners.

III. How have exports contributed to economic growth in Thailand?

In assessing the essence of exports as a growth driver, we have investigated the contributions of exports to the economy in different aspects through various tools and data sets to obtain the most comprehensive picture. This part starts with measuring net income generated by exports and net contribution of exports to Thai economic growth. Subsequently, the role of exports in boosting the factors affecting growth via the export-led growth hypothesis is analyzed. It is then followed by an assessment of the dynamic impact of exports on the domestic economy. This part ends with analyzing the challenges to the role of exports as the engine of growth going forward.

III.1 Net Income from Exports

To pinpoint the importance of exports in generating net income for the economy, comparing the size of the exports to the size of GDP would exaggerate export contribution because of certain raw materials and components that need to be imported for the production of exports. However net exports, total exports deducted by total imports, would also underestimate net income from exports as total imports also include imports derived from demand in the domestic market.

In this study, we propose the more appropriate measurement of the net income from exports, the value added (VA) of export production, by utilizing the input-output (I-O) table.[13] (See Appendix B for the

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[13] Net income generated by each component in GDP can be calculated by two methods: 1) deducting import content for exports from total exports and 2) computing the VA portion in total output generated by exports of each sector (as in III.2). Both can be

methodology) The VA of exports from the I-O table is calculated from the total output generated by export demand of each sector multiplied by a share of VA to total output of each sector, and therefore provides the better measurement of net income that export activities create. (See Appendix C for the methodology)

However, as Thailand's I-O tables are only available in some particular years, we map each item of exports in the harmonized system at the 10 and 11 digit levels, the most detailed levels with its corresponding item in the I-O table to generate the series of the VA of exports that reflects the changing structure of export composition over the years.[14]

We find that the ratio of merchandise exports to GDP has increased continuously from 21 percent in 1995 to 35.8 percent in 2008 although the ratio of import content of exports to GDP has increased at a slightly higher

Picture 3.1A : Value added of export goods

Source: National Economic and Social Development Board (NESDB) and Customs Department . Calculation by authors

Picture 3.1B : Import content of export goods

Source: National Economic and Social Development Board (NESDB) and Customs Department.. Calculation by authors
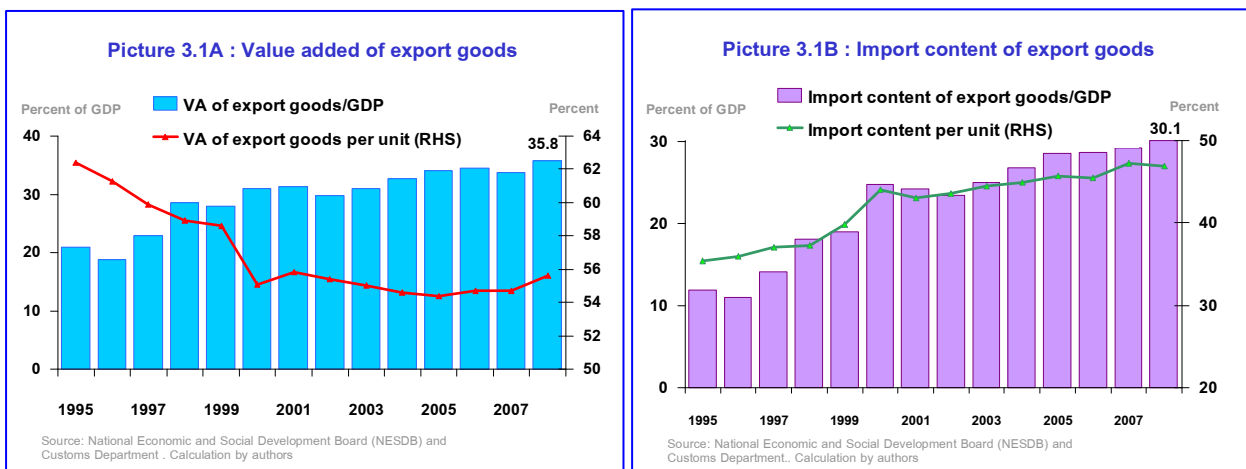
obtained from the I-O table and give the same results. However, in this part we use the VA method so that we can also find out the direct and indirect VA.

[14] The set of converter is borrowed from the NESDB. See the detailed calculation in Appendix D. In the aspect of production, the VA of exports calculated from the I-O table consists of direct and indirect components. The direct VA of exports refers to VA from the production of export activities whereas the indirect value added of exports includes value added from the related production of downstream industries. As for the aspect of returns to factors of production, the VA of production consists of 4 components: wages and salaries, operating surplus or profits, depreciation of capital, and indirect taxes deducted by subsidies.

pace as shown in Picture 3.1.[15] The reason is that Thai exports have increasingly concentrated on high-tech products, the group of exports that require significant imported components. Hence, the VA per unit of exports has declined due to the increasing import content per unit of exports especially that of high-tech products.

Despite the declining VA per unit of exports, the total VA of Thai exports has increased gradually for the past 6 years due to the fast rising export volume of high-tech products. This is because these products especially electronic products have been produced in Thailand, one of the important branches of the IPNs in East and Southeast Asia, to serve the huge and increasing global demand. The important example is the hard disk drive (HDD) industry whose exports have risen substantially and generated considerable export income albeit the high level of required import content. Thailand has become the second largest exporter since 2006 with the share of 17.4 in the global market in 2008.[16]   Therefore, we can conclude that exports have continued to generate substantial and increasing net income for the Thai economy.

III.2 Contribution of Exports to GDP growth

The relative importance of different GDP components as sources of GDP growth from period to period is commonly shown by comparing their "contributions" to GDP growth. The contribution of each GDP component to GDP growth is calculated as the share of each component in the previous year multiplied by the growth rate of that component from the previous year.

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[15] The analysis begins with the data from 1995 onwards because the convertor from the NESDB for mapping the harmonized codes to the items in the I-O table is not available for the data before 1995.

[16] See Kohpaiboon (2009) for the importance of the hard disk drive industry in Thailand.

However, the measurement of contribution of net exports (total exports minus total imports) to GDP growth as an indicator of the relative growth driving role of exports compared with other components of GDP can not reflect the role of exports in each period correctly. The reason is that it would likely underestimate the role of export and overestimate the role of domestic demand as an engine of growth during the normal periods. On the other hand, this measurement usually overestimates the role of net exports and underestimates the role of domestic demand components in cushioning the economy during the crisis period.

Picture 3.2 : Contribution to real GDP growth

Source: National Economic and Social Development Board (NESDB) and authors' calculation
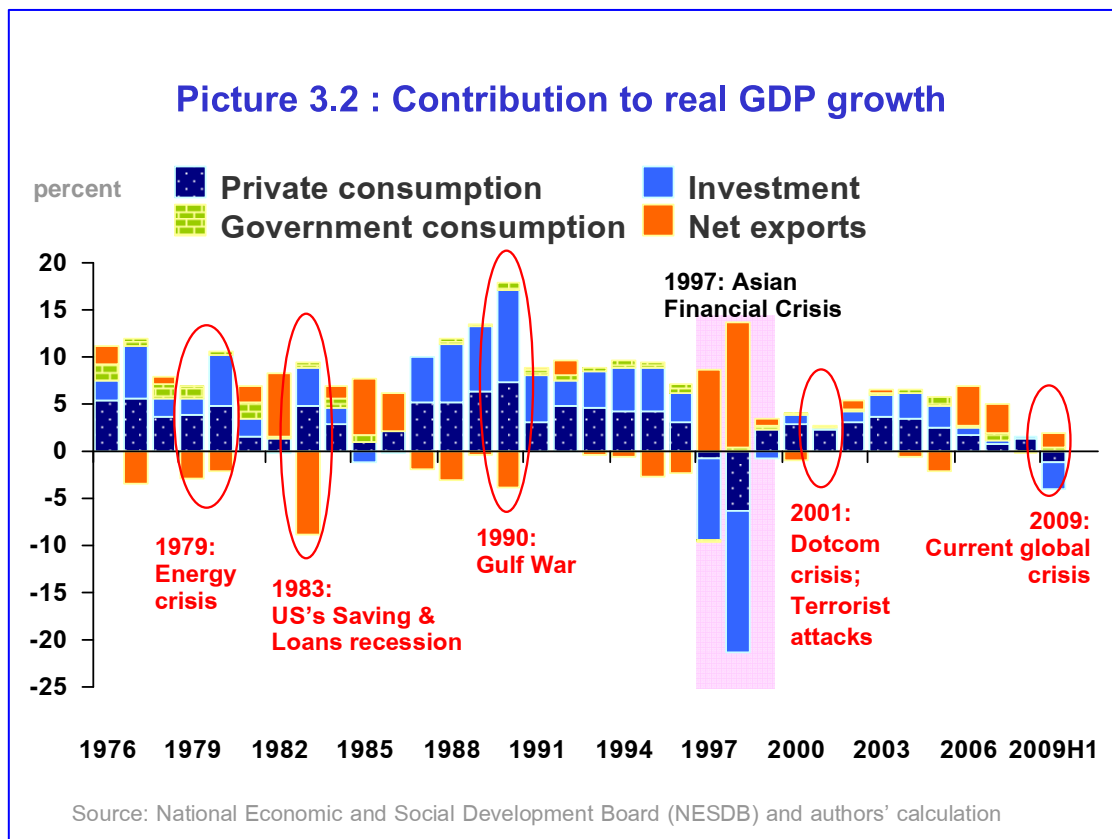
We find that, although exports have grown rapidly since the crisis in 1997 as discussed in Part II, net export contribution to GDP growth has been quite low (except during the Dot-com crisis in 2001) as depicted in Picture 3.2. Besides, the contribution of net exports to the GDP growth was significantly positive during the US Saving & Loan crisis in 1983, the Dot-com crisis in 2001, and the current crisis in 2009H1 as total imports declined substantially.

<u>Contributions to GDP growth of exports and domestic demand net of import content</u>

To assess the role of exports as well as domestic demand in contributing to yearly GDP growth more appropriately and precisely, we propose that each GDP component's import content is deducted from its associated GDP component before the calculation of the contribution of each GDP component to GDP growth. Hence, imports need to be classified into imports for domestic consumption, domestic investment, government expenditure, and export activities. We compute the import content of each GDP component from the I-O tables. (See Appendix E for the calculation of import content from the I-O table)

The above concept can also be explained by the following equations. From the identity of GDP in equation (1) below, net exports are equal to total exports minus total imports. However, total imports comprise imports for domestic consumption, domestic investment, government expenditure, and exports as shown in equation (2). Therefore, the identity of GDP can also be written as the sum of domestic consumption net of its import content (C-Mc), domestic investment net of its import content (I-Mi), government expenditure net of its import content (G-Mg), and exports net of its import content (X-Mx) as shown in equation (3).

$$GDP = C + I + G + (X\text{-}M) \tag{1}$$
$$M = Mc + Mi + Mg + Mx \tag{2}$$
$$GDP = (C\text{-}Mc) + (I\text{-}Mi) + (G\text{-}Mg) + (X\text{-}Mx) \tag{3}$$

where GDP = Gross Domestic Product

C   = Domestic consumption,

I   = Domestic investment,

G   = Government consumption expenditure,

X   = Exports,

M　= Imports,

Mc　=Import content of domestic consumption,

Mi　=Import content of domestic investment,

Mg　=Import content of government expenditure,

Mx　=Import content of exports activities

The contribution to GDP growth of each element on the right hand side of equation (3) would give the more correct role of each GDP component in propelling yearly GDP growth.[17] Nevertheless, this calculation method has two main limitations as follows.[18]

First, in calculating the import content in 1996-1997, the structure of inter-industry linkages is assumed to be the same as that of 1995. This may lead to an underestimation of the import content during those two years as high-tech exports accelerated. On the other hand, the import content of consumption and investment could be overestimated due to the following: 1) the 1995 I-O table represents the production structure prior to the crisis in 1997 with relatively high import levels for consumption and investment activities; and 2) consumption and investment dropped sharply during the crisis in 1997.

Second, as the complete I-O table for 2005 has not yet been officially published, we need to rely on the 2000 I-O table to calculate the import content for the period between 2000 and 2008. However, the export composition structure was relatively stable over the above period. In particular, the share of high-tech exports in total exports increased only

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[17] In this part, exports and other GDP component include both goods and services (as supposed to only goods in III.1) as obtained from the national income account so that their contributions can be compared.

[18] These limitations also apply for the VA calculation in III.1. However, the effects of the limitations on the results are relatively less in that part because exports are mapped from the detailed levels of the harmonized system into the I-O table to attain the possibly highest accuracy.

slightly from 61 percent in 2000 to 63 percent in 2008. As the high-tech exports require higher import content than other types of exports, the structure of import content for exports during 2001 to 2008 was not likely to be significantly different from that in 2000. However, it should be noted that import content for consumption and government expenditure during 2001 to 2004 was likely lower than in 2001 because of the government's policy to stimulate domestic consumption.

In spite of the above limitations, we think that this method of measuring contribution to growth is very useful as it helps uncover the notably more appropriate levels of contribution to GDP growth of exports and other GDP components. The above limitations may affect the magnitude of the import contents to a certain extent but it should not affect the relative contributions of different GDP components significantly.

Our analysis here clearly demonstrates that exports have been the main driver of yearly economic growth since the end of the Asian crisis period. This role has been very distinctive as the average contribution of exports to growth over 1999 to 2008 was at 2.9 percent per year compared to 1.5 in the case of domestic demand.[19]

This analysis also provides a very important finding as depicted in Picture 3.3 that whenever the Thai economy was affected by a foreign crisis, the contribution of exports to GDP growth would be negative due to export contraction. However, domestic demand would act as a buffer to external shocks as its contribution to GDP was always positive during the period of foreign crises. (The role of domestic demand will be discussed more extensively in Part IV)

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[19] This is completely different from the average contributions of exports and domestic demand to GDP growth between 1999 and 2008 from the usual method without considering import contents at 0.6 and 3.8 respectively.

Picture 3.3 : Contribution to real GDP growth

(excluding import content in each component)

percent
- ■ Net private consumption
- ■ Net government consumption
- ▨ Net investment
- ■ Net exports

1997: Asian Financial Crisis

1979: Energy crisis

1983: US's Saving & Loans recession

1990: Gulf War

2001: Dotcom crisis; Terrorist attacks

2009: Current global crisis

1976 1979 1982 1985 1988 1991 1994 1997 2000 2003 2006 2009H1

Note: Contribution to real GDP growth excludes change in inventories and statistical discrepancies
Source: National Economic and Social Development Board (NESDB) and authors' calculation

In sum, our study in this part shows that the appropriate contributions of exports and domestic demand net of their import contents clearly demonstrate that the export sector has been the main engine of growth since the end of the Asian crisis.

The above findings in III.1 and III.2 show the benefits of exports in generating income for the economy. However, the export sector also provides other important benefits which would be explored further in the following sections.

III.3 Export-led growth hypothesis

The Export-Led Growth Hypothesis (ELGH) is the main framework of economic development that has been mentioned as the successful driving force behind the growth performance of Japan during the 1960s to the 1980s, and several East and South East Asian economies since 1980s. The main idea is that, as the foreign markets are substantially larger than the

domestic market, the economy would benefit not only from participating in the world trade arena and gain export incomes but also from capital accumulation, employment of labor as well as technological spillovers and other positive externalities from exporting activities. The export sector therefore has an essential role as the booster of long-term economic growth in this framework. In addition, parts of the benefits also come from the required higher standards of goods and services and participation in the highly competitive setting abroad.

We then try to look into the extent to which the export sector has contributed to capital accumulation and employment by assessing relevant real sector variables, as well as increased productivity in the Thai economy by the evidence from earlier empirical studies.

Capital Accumulation

As the capital accumulation leads to an increase in production capacity, we examine the main indicator reflecting capital accumulation, the industrial capacity index. This index has three sub-indices; capacities for export-oriented industries (exporting more than 60 percent of their productions), capacities for industries with moderate export activities (exporting between 30 and 60 percent of their productions), and industries with low export activities (exporting less than 30 percent of their productions), allowing us to compare their speeds of capital accumulation.[20]

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[20] The criteria for this classification are the same as those for the manufacturing production index. See the details in www.bot.or.th

It is found that since 2000 the capacities of the export-oriented industries have increased a lot more sharply than those of the other groups, indicating significantly higher investment in these industries as shown in Picture 3.4.[21] In particular, since 2004, their capacities have increased by

Picture 3.4 : Capacity index

Picture 3.5 : Industrial FDI
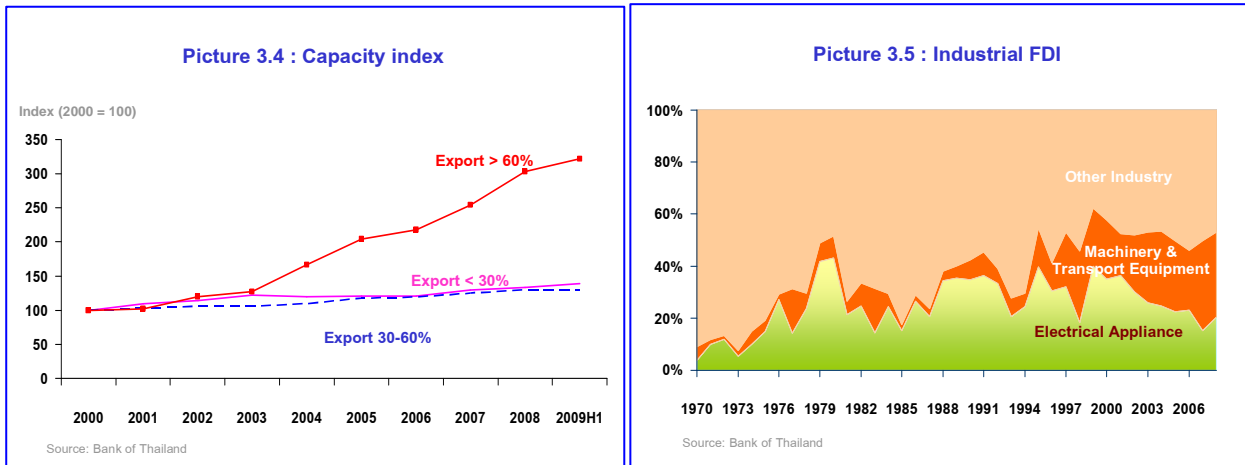
152.7 percent whereas those with moderate and low export activities have increased by just 23.0 and 14.3 percent respectively. This reflects that the domestic consumption has not significantly induced domestic investment for quite some time.

At the sectoral level, the main export oriented industries with rapidly rising capacities have been computer and parts whereas a significant portion of investment in the export-oriented industries has been from the FDI. (See Picture 3.5) FDI in the electrical appliance and machinery and transportation equipment industries has accounted for more than 50 percent of the FDI in the whole industrial sector and more than 8 percent of the private investment since 1995, demonstrating the increasing role of the IPNs in fostering capital accumulation in the Thai economy.

It should be noted that, prior to the Asian crisis, the export-led growth policy direction also induced capital accumulation in the public

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[21] The capacity index before 2000 had a less extensive coverage of industries. In particular, it did not contain the production of computer and parts. Hence, we only show the index starting in 2000.

sector in the form of investment in public infrastructures necessary for foreign investment in the export sector.[22] However, this relationship has become less evident since the Asian crisis as the government needed to allocate a significant amount of budget for lessening the crisis impact on the financial sector and put an emphasis on stimulating private consumption, leading to the lower levels of government investment in the post-Asian crisis period.

Employment

With the lack of employment statistics directly indicating employment in the export and export-related sectors, we estimate the number of workers associated with export activities from the National Statistical Office of Thailand (NSO)'s Labour Force Survey combined with the I-O table. (See Appendix F for the calculation method for this employment). We find that the employment numbers related to exports increased significantly in the 1990s mainly due to the rising employment in the export-oriented industries

Picture 3.6 : Total employment associated with export activities

million persons

Indirect employment

Employment in export sector

1981 1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007

Source: National Economic and Social Development Board (NESDB) and National Statistic Organization (NSO). Calculation by authors
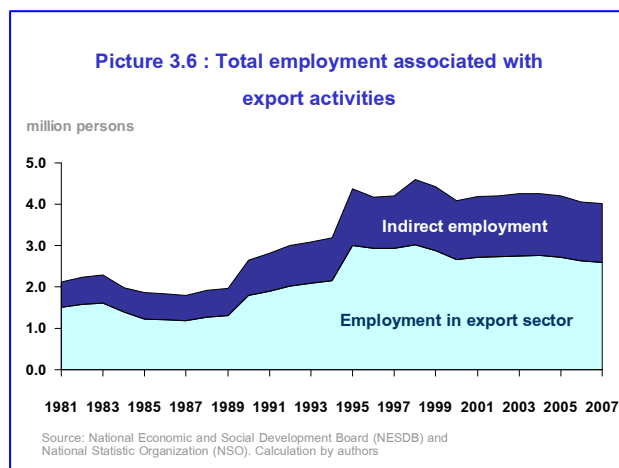
as the MNCs' increased their FDIs in the Thai economy. The level of employment induced by export activities has been relatively stable in the 2000s because rising exports have been largely from the highly capital intensive export sector. (See Picture 3.6)

In 2007, there were approximately 4 million workers or more than half of workers in the industrial sector who worked for export related

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[22] See Akrasanee, Dapice, and Flatters (1991)

activities.[23] Among them, 2.6 million workers or as much as 48.5 percent of workers in the industrial sector were directly employed by the export sector whereas as many as 1.4 million workers were indirectly associated with export productions, most of who worked in the downstream non-export sector.

The above level of employment implies the importance of the export sector on private consumption as these workers in the export oriented industries such ad electronics, electrical appliances and vehicles and equipments earned more than twice of the salary of workers in the agricultural sector who accounted for 40 percent of total employment in 2008. (See Table 3.1)

Table 3.1 Sectoral average salary

	Average salary per month (2008)
Agriculture	3,791
Manufacturing	7,225
- Electronics	8,051
- Electrical appliances	8,726
- Vehicles and equipments	9,118
Services	12,200

Source: National Statistical Office of Thailand

Productivity

In discussing exports and its productivity benefits, we rely on a number of theoretical as well as empirical studies at the firm and industry levels in Thailand and other economies.[24] The export sector can contribute to an increase in the productivity in the economy in two important ways. First, it helps foster the overall level of productivity as it is the more

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[23] In 2008, total employment in the economy was at 37 million persons with 14.7, 8.8 and 5.5 million workers in the agricultural, services, and industrial sectors respectively.

[24] See an extensive literature review in this area in Loecker (2007) and Wagner (2005).

productive sector in the economy. Second, export firms also create positive externalities for their partners and other firms through different channels of technological spillovers.

As for productive capacities of export firms, there are two competing firm-level mechanisms: self-selection and learning-by-exporting. The "self-selection" mechanism argues that only productive firms are capable of exporting because exports activities associate with additional entry costs[25] and greater market competition. In contrast, the "learning-by-exporting" mechanism points out that the firm's productivity improves after entering into the international market particularly through acquired knowledge and technical expertise from dealing with foreign customers.

The self-selection mechanism has several empirical supports in various economies. (See Loecker (2007) and Wagner (2005)) For the cases of Thailand and other emerging Asian economies, Hallward-Driemeier et. al. (2002) shows that Thai-owned exporters had higher productivity than non-exporters[26] and finds productivity enhancement during the pre-export stage[27].

Likewise, several empirical studies also lend support to the "learning-by-exporting" mechanism. One of the main findings is that firms that export to developed economies tended to have higher productivity than firms that export to less-developed economies.[28] Several strong evidences

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[25] Costs to enter international markets include an establishment of foreign networks, transportation arrangement, knowledge of consumers' tastes in foreign markets, and product appearance adjustments for foreign markets.

[26] The important control variables in the study include minority and majority foreign ownerships, medium and large sizes of firms, firm age, location in capital city, and FDI.

[27] This empirical study shows that firms tended to have business plans on exporting prior to their actual exports. This is reflected from their engagement in "the training of their work forces, the vintage of their capital equipment, the use of auditing, and other aspects of their production processes and operations".

[28] The more elastic foreign demand encourages exporters to invest not only on physical items such as equipments and machineries to gear up economies of scale but also on management knowledge, more advanced technology and technical know-how.

in this respect were documented in cases of the Asian economies (Wagner 2005) including Korea (Aw, Chung and Roberts (2000), Taiwan (Liu, Tsou and Hammitt (1999, 2001), Aw, Chung and Roberts (2000), and Indonesia (Blalock and Gertler (2004).

On the other hand, the benefits to other sectors in the form of the positive externalities from the export sector were found to include more efficient allocation of resources, an increase in productivity of workers and manufacturing productions, technological development, an enhancement in know-how, tacit knowledge and, an increased probability of exporting success as shown by Feder (1982) and Jongwanich and Kohpaiboon (2008).[29]

In the case of Thailand, the presence of MNCs increased the probability of exporting success for Thai local firms. One of the early-on examples was in the processed food industry where MNCs played a crucial role in establishing export activities of locally-owned firms in the initial stage in canned pineapple, canned tuna, processed chicken, and processed shrimp industries. Technology and knowledge transferred from MNCs came in different channels such as demonstrations (particularly in both canned food industries), labor mobility (canned pineapple industry), assistance in marketing (all industries) and joint ventures (processed chicken and shrimp industries). (See Kohpaiboon (2005) and Jongwanich and Kohpaiboon (2008))

In addition, MNCs also helped in establishing locally-owned suppliers and provide technology and expertise to suppliers particularly in vehicle and electronics industries (Kohpaiboon, 2005 and 2009; Charoenporn, 2009).

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[29] The determinants of the success of productivity spillovers include various channels and factors such as technology gap, absorptive capacities, firm characteristics and government policies. See Appendix G for the detailed framework. (2007)

Thus, the various aforementioned evidences about the levels of productivity of the export sector and its productivity spillovers to other sectors evidently point out that export activities are an essential source of productivity growth for the Thai economy.

III.4 Dynamic impact of exports on the domestic economy

As the export sector has contributed extensively to capital accumulation, employment, and productivity over time not only in its own sector but also in other sectors, changing exports would have had a significant dynamic impact on the domestic economy. Hence, we think it is important to investigate how exports help contribute to growth through its dynamic impact on the domestic economy.

The Structural Vector Auto Regression (SVAR) is employed to find out the impact of changing exports on domestic consumption and investment over the periods. This model is adopted because it is small yet sufficient for our purpose of investigating dynamic relationships of a small set of endogenous variables. It has the benefits of the Vector Auto Regression (VAR) as it can provide the magnitude of dynamic interactions between endogenous variables as the data speak. However, we can still impose the pre-determined relationships or restrictions among the variables from common knowledge or economic theory.

The endogenous variables in the model here are quarterly demand components of GDP including exports of goods and services, imports goods and services, private investment, private consumption whereas the exogenous variables include trading partners' GDP and government expenditure. The data in the study are from 1993Q1 to 2009Q1. (See Appendix H for the methodology and detailed results)

In this study, the restrictions are from knowledge in the earlier parts of the paper as shown in Picture 3.7. As examined earlier that the exports have an important role in inducing employment and capital accumulation in

the domestic economy, exports would influence private consumption and private investment in this SVAR. Since the imports include consumer goods, capital goods imports, and material imports, total imports are induced by private consumption and private investment exports. Besides, private consumption also has impact on private investment as it responds to consumers' demand in the domestic market. As for exogenous variables, trading partners' GDP affects exports whereas government expenditure can impact private consumption, private investment, as well as imports.

Picture 3.7 : Structural VAR restrictions

Note: 1. The dummy variable is used for Asian crisis
2. Optimal lag 2 periods
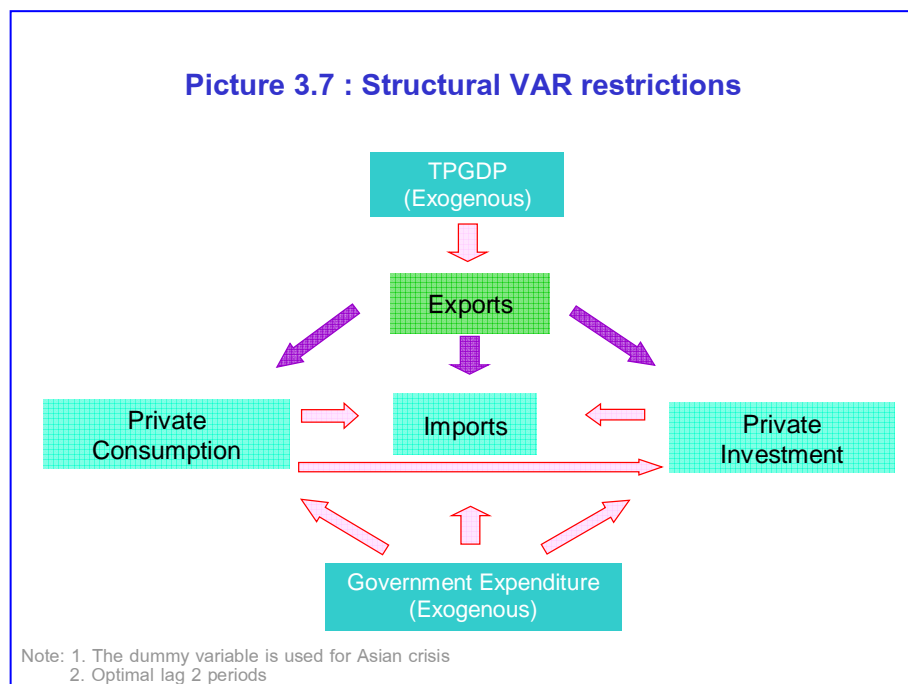
The results of the study clearly point out that exports have had significant effects on private consumption and especially on private investment. They are shown in terms of the impulse response of private consumption and private investment to shock to exports and their variance decompositions over time as shown in Picture 3.8.

We find that a temporary shock by the exports of 1 percent magnitude would affect the private consumption and the private investment by as much as 0.11 and 0.24 percent of GDP in the eighth and seventh

quarters.[30] (See Picture 3.8) These results show that the effects on these two components of domestic demand are high and take time before reaching the peaks.[31] We believe that some important reasons for the lagged effects are as follows. For private investment, it usually takes a certain period of time before a company can incur new investment after realizing a better export prospect. As for private consumption, because of training costs, firms tend to increase/cut working hours for a period of time before hiring/firing workers in response to a changing prospect of their export income.
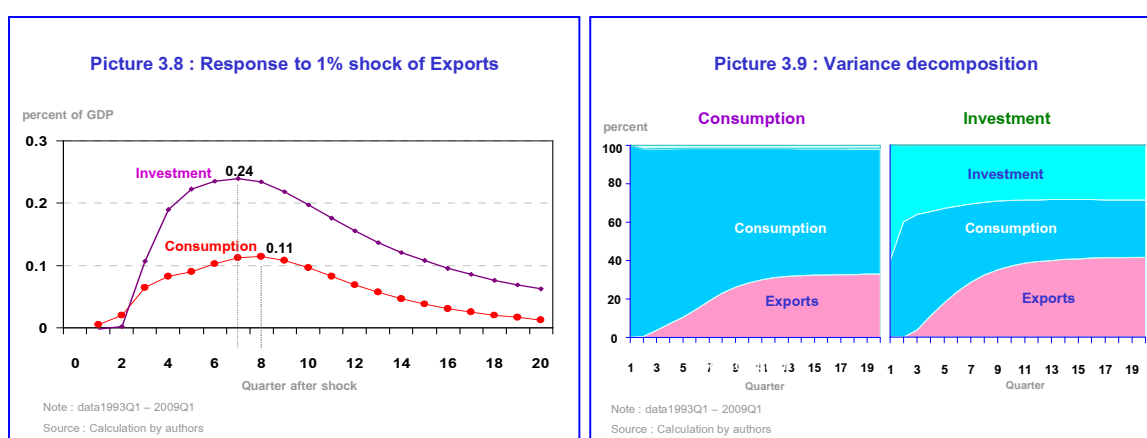
Besides, the magnitude of the response of private investment is greater and the impact lasts longer than that of the private consumption. We think that the reason is because private investment is more sensitive to the prospect of rising and declining income than consumption as workers tend to smooth their consumption, increasing their consumption only slightly until they are certain that their income increases permanently.

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[30] The response of private investment is flat in the first and second quarters after a shock because investment is those periods likely corresponds to the investment decisions prior to the shock.

[31] As the sample includes the pre-Asian crisis periods where private investment increased sharply following rising exports, the impulse response of private investment in the model could overestimate its response in the more recent period to a positive export shock to a degree. In addition, one limitation of the VAR type of model is that both positive and negative shocks lead to symmetric responses of endogenous variables in the system. Hence, as the sample covers mostly the non-crisis periods, the response to a negative shock to exports may also likely be underestimated.

As for the variance decomposition of private consumption and investment, the results demonstrate the importance of exports in increasingly influencing private consumption and investment over time as follows. (See Picture 3.9) The variance of the forecasted private consumption is explained by mostly itself in the first two years but, from the third year onwards, one third is attributable to exports. For private investment, private consumption explains about half of the forecasted variance of private investment in the first few periods but its influence declines steadily in the second year before explaining roughly 30 percent of the forecasted variance of private investment for the remaining period. On the other hand, exports' influence on investment increases sharply from nil in the beginning until reaching about 40 percent of the forecasted variance of the private investment in the third year onwards. Hence, exports have relatively more impact on the private investment relative to the private consumption or demand from the domestic market over the time horizon.[32]

In conclusion, a variety of analyses using various data sets in this part substantiate the importance of exports to the Thai economy. The export sector has made considerable contributions to the Thai economy as a provider of significant income and the most important engine of growth. Furthermore, export activities have had substantial impacts on both private consumption and private investment over time.

III.5 Challenges to the role of exports as the engine of growth

Despite the sizeable role of exports as the engine of Thailand's economic growth, we also need to address major challenges that could

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[32] On the other hand, the variance decomposition of exports shows that most of the variations of exports are explained mostly by exports itself even when we employ the VAR instead of the SVAR to discard the imposed unidirectional relationship from exports to other GDP components.

potentially diminish exports' contributions to the economy within the medium term future as follows.

First, the G3 economies as well as the global economy would likely grow at a significantly lower pace than in the pre-crisis period. For example, the IMF (April, 2009) expected that the growth of the G3 economies and the world economies would be at an average of 1.13 and 3.22 percent during 2009-2014 compared to 2.20 and 4.35 percent during 2002-2007, especially as the level of potential GDP in the G3 would decline from the pre-crisis period.[33] It is also expected that the US consumption would grow considerably more slowly because of the more stringent credit standards to households. Besides, the policies to stimulate domestic demand in various economies could implicitly act as de-facto trade protectionism, reducing the expansionary room for Thai exports.

Second, the role of exports in inducing private investment might lessen as the export sector had invested quite significantly prior to the crisis period. As a result, there exist significant spare capacities in the high-tech industries as well as other export-oriented industries as reflected by capital utilization level at merely 57.8 percent in June 2009. The improvement in exports in the medium term would therefore not likely lead to fast increasing investment.

Third, Thai exports would continue to be vulnerable to external demand shocks as high-tech exports are sensitive to trading partners' GDP. Therefore, cyclical downturns of major trading partners in the future would likely significantly affect Thai exports.

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[33] OECD (2009) points out that lower potential GDP in the G3 in the medium term would be a result of the following factors. First, capital accumulation would slow as there exists significant excess production capacities. Second, structural unemployment would be at a high level as policies to enhance social security and unemployment benefits would constitute disincentives for workers to enter the labor market. Third, total factor productivity (TFP) would decline as firms' cost cutting efforts would affect spending on R&D.

Looking into the medium term, exports would likely continue to contribute significantly to Thailand's economic growth especially because of comparative advantages in the productions of several products and the established footholds in the IPNs in certain high-tech industries. Nonetheless, major challenges exist. In order to determine the relative contributing role of exports going forward, the potential of its alternative, domestic demand, would be assessed in Part IV.

IV. Potential of domestic demand as the growth engine

It is undeniable that the domestic demand which consists of consumption and investment needs to act as a cushion for the economy during the time of crisis originated from outside. However, the argument of some economists goes beyond the role of short-term stabilization by domestic demand. They believe that the export-led growth strategy has exposed the economy to cyclical downturns of the world economy that are too large for the Thai economy. Hence, domestic demand should also take a lead in the medium and long terms.

In this part, we therefore try to assess the potential of the domestic demand in taking the lead role as the growth engine for Thailand and point out the appropriate role of domestic demand in the medium and long term future. We start by analyzing the role of domestic demand in generating net income for the Thai economy during 1976 to 2008 as well as analyzing the possibility of the domestic demand in generating income to substitute for that from exports. Then we investigate the role of the domestic demand in contributing to economic growth in the past followed by an examination about its potential to replace exports as the main engine of growth in the medium and long terms. Subsequently, the appropriate role of domestic demand in enhancing further economic growth is discussed.

IV.1 Role of domestic demand in generating net income

In this section, we analyze the role of the domestic demand in creating net income for the economy compared to exports as well as its ability to replace export income in the short term.

To compare the importance of domestic demand and exports in generating income, the appropriate measurement would be the VA of these two variables to GDP with the same reason discussed in III.1. The ratios of the VA of domestic demand and exports to GDP shown in Picture 4.1 demonstrate that the VA of domestic demand of 69.2 percent in 2008 was significantly larger than the size of exports of goods and services of 34.7 percent.[34] Nonetheless, the VA of domestic demand to GDP grew at a very low average rate of 4.9 per year whereas the VA of exports to GDP rose by as much as 9.9 percent per year on average during 1975 to 2008. Therefore, despite the smaller VA, exports which rely on the foreign markets have been significantly more potent in generating incremental net income for the economy than the domestic demand.
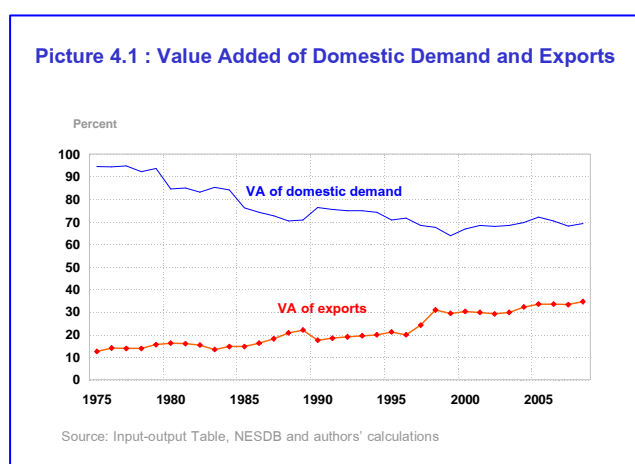
Picture 4.1 : Value Added of Domestic Demand and Exports

Percent

VA of domestic demand

VA of exports

1975   1980   1985   1990   1995   2000   2005

Source: Input-output Table, NESDB and authors' calculations

To examine the short-term potential of domestic demand to replace export income, we analyze the extent to which the domestic demand needs to increase to compensate for the declining export income. The 2000 I-O table is utilized to analyze the short-term capability of domestic demand by comparing the value added of generated from the domestic demand with

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[34] In this section, exports refer to goods and services in the National Income Account unlike those in III.1

the value added from exports. (See Appendix C for the method of calculation and its limitations)

We find that a decline in exports worth 100 baht would lead to a decline in VA by 55.6 baht in the economy. To compensate for the exact loss in VA from declining export, the VA of domestic demand needs to increase by 55.6 baht. According to the I-O table analysis, a 55.6 baht increase of the VA of domestic demand requires an increase of total domestic demand of 69.8 baht. (See Table 4.1) In the percentage term, to maintain the VA in the economy in the case of a decline of one percent of exports, domestic demand needs to increase by 0.45 percent.

Table 4.1 Compensation for export loss

	Component	Baht	% change
Amount of loss	Exports ⬇	100.0	1.00%
	Value-added (VA) ⬇	55.6	14.9 billion baht
Amount required to compensate for VA loss	Domestic demand ⬆	69.8	0.45%
	Private consumption ⬆	69.1	0.68%
	Government consumption ⬆	61.4	2.81%
	Investment ⬆	80.7	2.64%

Source : Authors' calculations

For example, as the current global crisis has led to the loss of exports by as highly as 0.6 trillion baht from 2008 Q4 to 2009Q2, domestic demand has to rise by 0.42 trillion baht to compensate for the export decline. An increase of the domestic demand by the above substantial amount is highly impossible as the domestic demand can not grow very substantially in the short period of time.

IV.2 Contribution of domestic demand to economic growth

As for the contribution of the domestic demand to economic growth, by analyzing the contribution of each domestic demand component net of its associated imports to growth from 1976 to 2008 (See Appendix E for the calculation), we observe the significant role of domestic demand in contributing to short-term growth during the periods of economic expansion and economic contraction as follows. (See Picture 3.3 in III.2 and Table 4.2)

During the economic expansion phases, the contribution of the domestic demand to the GDP growth varied in the three periods: domestic demand-led (1976-1985), co-engine (1986-1996), and export-led (1997-2008). In the domestic demand-led period, the Thai economy relied on the domestic demand as the main contributor to the economic growth both during the upturn and downturn. Private consumption contributed the most to the GDP growth during the upturn whereas the main contributor during the energy crisis in 1979, which affected Thai exports in 1980 and the US saving and loan recession in 1983, was investment especially from the public sector.

In the co-engine period, domestic demand contributed significantly to economic growth along with the export boom. However, the contribution of investment which was higher during 1987 to 1989 became generally lower than those of consumption in the first half of 1990s because the import content of investment peaked as a result of the boom in investment. Although the contribution of the domestic demand was higher than that of exports during this period, it should be noted here that this analysis does not capture the dynamic impact of exports on domestic demand in which both private consumption and investment were significantly induced by export activities but much less vice versa. (as analyzed earlier in III.4) This implies

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that the contribution of exports during this period could be more significant if the dynamic impact is also included in the analysis.

Table 4.2 : Contribution to GDP Growth (Net of import content of each GDP component)

Year	Type of Crisis	Private consumption net of import content (1)	Government consumption net of import content (2)	Investment net of import content (3)	Domestic demand net of import content (1)+(2)+(3)	Exports net of import content	Real GDP-StockStat	Real GDP	Role of DD and exports
1976		4.44	1.59	1.46	7.49	3.66	0	9.17	
1977		2.87	0.49	3.58	6.94	1.45	0	9.86	
1978		3.04	1.6	1.4	6.04	1.86	0	9.88	
1979	Oil Price	0.53	1.06	-0.95	0.64	3.48	0	5.24	
1980		4.16	-0.19	6.14	10.11	-1.48	0	4.61	DD lead
1981		1.37	1.74	1.86	4.97	1.94	6.96	5.91	
1982		3.51	0.42	1.26	5.19	2.96	8.12	5.35	
1983	US saving and loans recession	0.97	0.17	1.53	2.67	-2.1	0.55	5.58	
1984		1.72	0.85	1.04	3.61	3.38	7.12	5.75	
1985		3.54	0.84	0.1	4.48	2.09	6.61	4.65	
1986		2.26	-0.07	-0.11	2.08	3.75	5.76	5.53	
1987		1.54	-0.52	2.23	3.25	4.88	8.02	9.52	
1988		-0.03	-0.36	2.48	2.09	6.72	8.81	13.29	
1989		2.86	-0.28	4.37	6.95	6.13	13.62	12.19	
1990	Gulf War	9.49	2.09	2.47	14.05	-0.18	14.25	11.17	Co-lead
1991		1.31	0.4	2.6	4.31	4.43	8.75	8.56	
1992		3.54	0.45	1	4.99	4.56	9.52	8.08	
1993		2.78	0.28	1.19	4.25	4.12	8.25	8.25	
1994		2.11	0.5	1.72	4.33	4.74	8.92	8.99	
1995		1.32	0.52	1.39	3.23	3.48	6.61	9.24	
1996		3.26	0.96	3.09	7.31	-2.53	4.82	5.90	
1997	Asian	1.08	-0.12	-6.38	-5.42	4.31	-1.12	-1.37	
1998	Asian	-3.99	0.59	-5.8	-9.2	1.45	-7.89	-10.51	
1999	Asian	0.89	0.22	-1.78	-0.67	3.53	2.83	4.45	
2000		-0.14	-0.01	-0.21	-0.36	3.44	3.09	4.75	
2001	Dot-com	3.14	0.28	0.87	4.29	-1.6	2.74	2.17	
2002		0.88	-0.06	-0.2	0.62	4.69	5.39	5.32	Export lead
2003		2.18	0.14	1.41	3.73	2.85	6.67	7.14	
2004		1.16	0.35	1.15	2.66	3.43	6.21	6.34	
2005		0.89	0.86	1.2	2.95	0.82	3.84	4.60	
2006		1.03	0.18	0.47	1.68	5.3	7.16	5.23	
2007		0.23	0.76	-0.15	0.84	4.1	4.99	4.93	
2008	Global recession	-0.06	-0.03	-0.7	-0.79	2.15	1.38	2.59	

Sources: NESDB and authors' calculations

However, in the export-led period, the role of domestic demand especially private investment in contributing to growth has been distinctly less potent than that of exports except in 2003 and 2005 when the government deployed various economic stimulus projects to boost the domestic economy. The leading causes of the decline in the contribution of private investment included more careful investment decisions by the corporate sector and the financial institutions' stricter lending standards and

emphasis on risk management after the crisis experience in 1997-1998 as well as elevated political risks during 2006 to 2008.

On the other hand, it is very important to point out that the domestic demand has played a crucial role in cushioning the economy during the periods of foreign crises including the oil crisis in 1979 and 1980, the US saving and loans crisis in 1983, the Gulf war in 1990 and the Dot-com crisis in 2001.(as briefly discussed in III.2) Investment, especially from the public sector, was the major buffer during the first two crisis periods while private consumption took the main role during the last two crisis periods.

IV.3 Potential of domestic demand as the main growth engine

To assess the potential of domestic demand to become the main engine of growth, we focus our study on the question of whether domestic demand could replace exports in the medium and long terms. The idea of this investigation is that, to rely mainly on domestic demand to propel growth in the medium and long run, the domestic market needs to be sizable enough to allow for large income generation to compensate for the reduced reliance on exports for growth. This is because the export-led growth strategy is based on the notion that the size and purchasing power of the external markets are the crucial factor that induces growing production from the export-oriented economy. Moreover, the export sector has been the significant efficiency enhancer and productivity provider. Hence, domestic demand activities need to be able to make up for this role of export activities when the reliance is shifted to the domestic market.

We perform this investigation by examining the potential size of the domestic market based on the number of population and per capita income as well as the degrees of competitiveness and innovations by benchmarking the Thai indicators with those in the developed and other developing

economies. In the sample of 45 economies consisting of both advanced and emerging economies, we obtain the following important findings.[35]

1) <u>Population</u> All the economies with population above 100 million had the ratio of exports to GDP below 50 percent on average during 2004 to 2008, implying that they depended more extensively on the domestic market than the foreign markets as depicted in Picture 4.2. The examples are China(CN), India(IN), and the US.

Picture 4.2 : Population and Exports to GDP

Source : World Economic Outlook (WEO), International Financial Statistic (IFS) and CEIC

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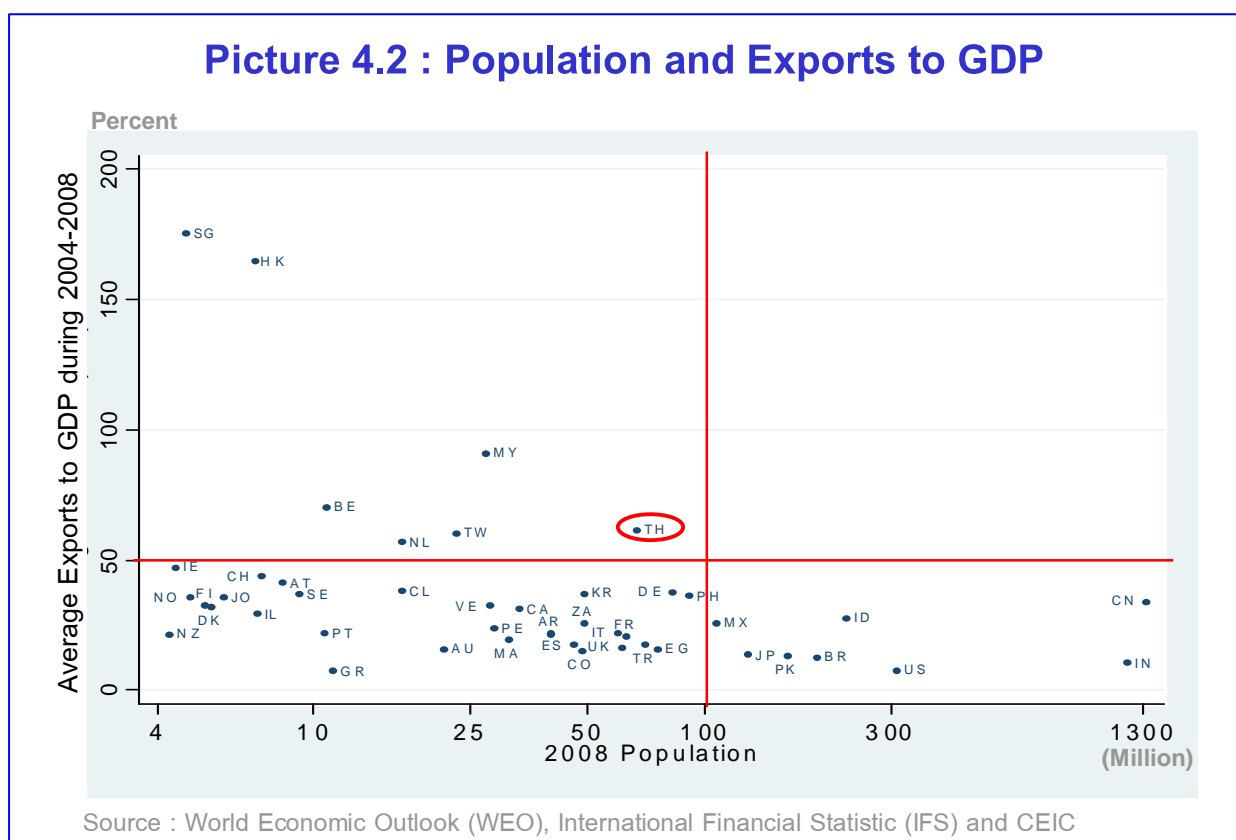
[35] The chosen group is based on the availability of population, trade, and level of competitive data. It includes Argentina (AR), Australia (AU), Austria (AT), Belgium (BE), Brazil (BR), Canada (CA), Chile (CL), China (CN), Colombia (CO), Denmark (DK), Egypt (EG), Finland (FI), France (FR), Germany (DE), Greece (GR), Hong Kong (HK), India (IN), Indonesia (ID), Ireland (IE), Israel (IL), Italy (IT), Japan (JP), Jordan (JO), Korea (KR), Malaysia (MY), Mexico (MX), Morocco (MA), Netherlands (NL), New Zealand (NZ), Norway (NO), Pakistan (PK), Peru (PE), Philippines (PH), Portugal (PT), Singapore (SG), South Africa (ZA), Spain (ES), Sweden (SE), Switzerland (CH), Taiwan (TW), Thailand (TH), Turkey (TR), United Kingdom (UK), United States (US), and Venezuela (VE).

2) Per capita income For the high per capita income economies, there are several of these economies that had population below 100 million but relied more on the domestic market than the foreign markets such as the UK, Germany(DE), and France(FR). However, the developed economies with lower population numbers such as Belgium (BE), the Netherlands (NL), Hong Kong (HK), and Singapore (SG) relied mainly on exports as the main source of income. (See Picture 4.3)

Picture 4.3 : Per capita GDP and Exports to GDP
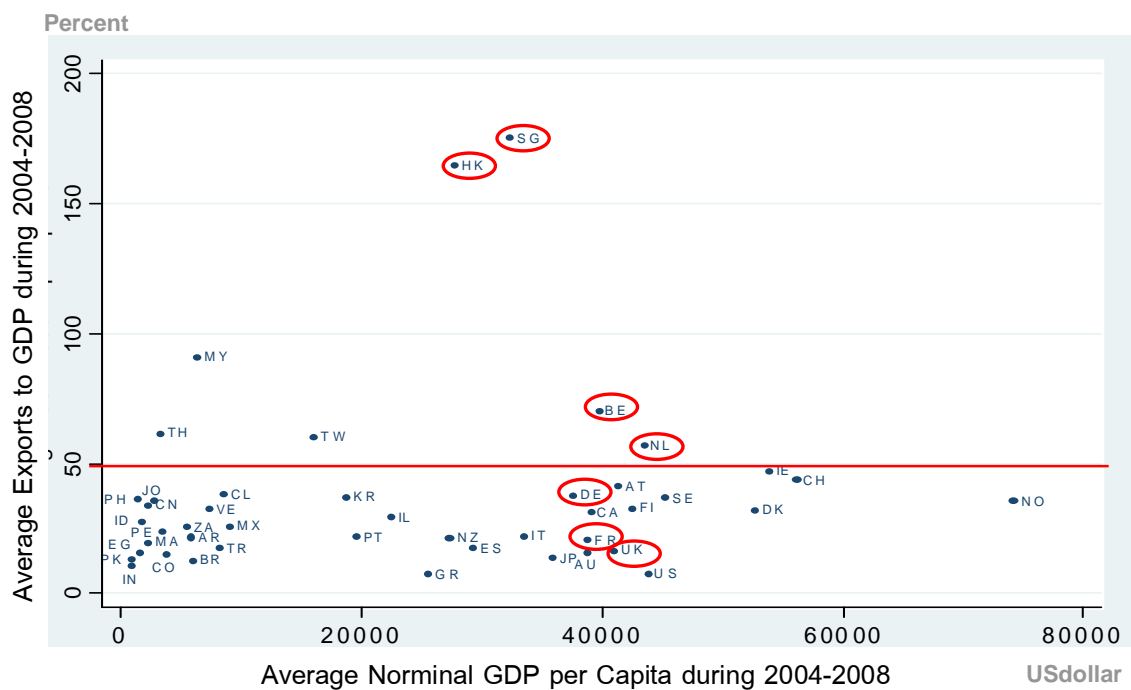
Source : World Economic Outlook (WEO), International Financial Statistic (IFS) and CEIC

3) <u>Competitiveness</u> The export dependent developing economies tended to have relatively higher levels of competitiveness as shown by the Global Competitiveness Index (GCI) which captures basic institutional and macroeconomic requirements, efficiency, and innovations.[36] (See the Picture 4.4) On the other hand, developing economies with low levels of exports to GDP ratio were those with low competitiveness.   Among the three aspects of competitiveness in the GCI, we find that innovative capacity is particularly low in developing economies. (See Picture 4.5)

Picture 4.4 : Competitiveness and Export to GDP
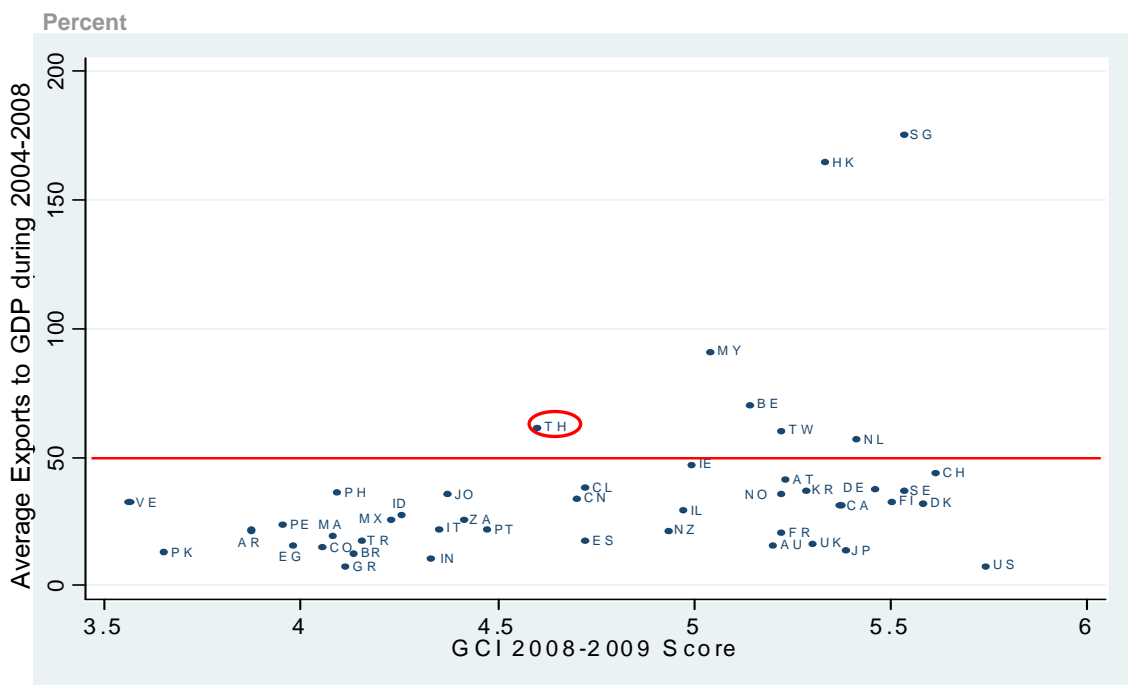
Source : World Economic Forum, International Financial Statistic (IFS) and CEIC

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[36] The Global Competitiveness Index (GCI) reported in the World Economic Forum's annual Global Competitiveness Reports is a comprehensive index measuring national competitiveness that contains 4 basic requirement indicators including institutions, infrastructure, and macroeconomic stability, health and primary education, 6 efficiency indicators including, higher education and training, goods market efficiency, and labour market efficiency, financial market sophistication, technological readiness and market size, and 2 innovation indicators, business sophistication and innovation. It is obtained using panel data for over 130 countries and up to 7 years (2001–07).

Picture 4.5 : Innovation and Per Capita GDP
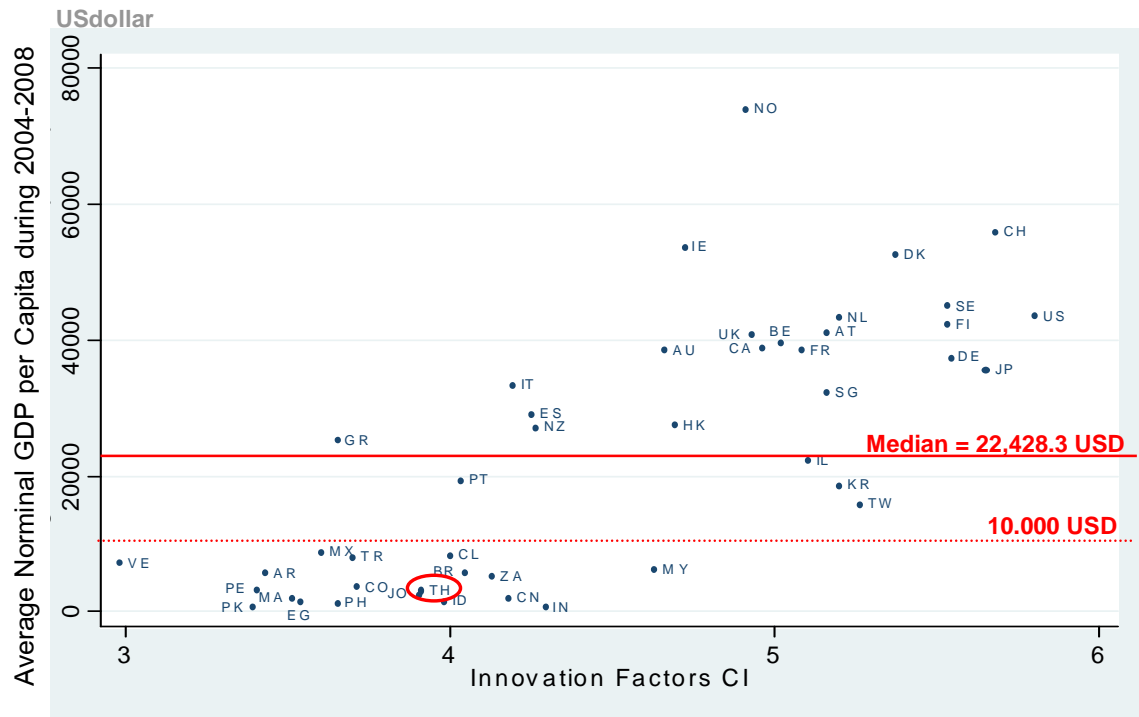
Source : World Economic Forum, World Economic Outlook (WEO) and CEIC

Importantly, the above findings indicate that, to rely more on domestic demand to create income for the economy, the size of the domestic market has to be large enough either in terms of population or per capita income. There is also a strong association between being export-oriented and the levels of competitiveness as well as per capita income among developing economies. In addition, with the low level of innovative capacity in the developing economies, small developing economies focusing mainly on the productions for the domestic market would likely lose the opportunities to learn and adopt technologies from their potential export partners as well as the MNCs as discussed in III.3.

<u>The possibility of Thailand to depend on the domestic market-led growth policy</u>

Thailand has depended heavily on the foreign markets with a 5-year average of the ratio of exports to GDP at 68.8 percent. With a moderate level of population together with a per capita income much below those in the advanced economies, it would be difficult for Thailand to rely mainly on the domestic market for achieving continually better standard of living. Switching from the foreign markets to the domestic market would imply a huge loss of income especially from the exports of high-tech products. This is because most of the production of high-tech products in the IPNs (roughly half of high-tech exports) needs a massive size of production to achieve economies of scale and requires a global scale of demand in which the domestic market can not substitute.

Although, Thailand's per capita income at 3,243.3 US dollars was far below the median at 22,428.3 US dollars and was the lowest among the group of those who relied significantly on the foreign markets, the competitiveness level and per capita income of Thailand were higher than those developing economies that did not rely on exports. In particular, among the economies at the similar level of per capita income, the competitiveness level of Thailand was lower than China (CN), Chile (CL), and Malaysia (ML) but higher than all domestic market-oriented economies. This observation leads us to believe that if Thailand tries to reduce the role of exports, it is likely that competitiveness would be eroded and the growth performance would likely be largely weakened. (See Picture 4.6)

Picture 4.6 : Competitiveness and Per Capita GDP

USD.

Average Norminal GDP per Capita during 2004-2008

- NO
- CH
- DK
- IE
- SE
- AT
- NL
- FI
- US
- BE
- UK
- FR
- CA
- DE
- AU
- JP
- IT
- SG
- ES
- HK
- GR
- NZ
- IL

Median = 22,428.3 USD

- PT
- KR
- TW

10.000 USD

- TR
- MX
- VE
- CL
- AR
- BR
- MY
- PE
- CO
- EG
- MA
- ZA
- JO
- PK
- PH
- ID
- IN
- TH
- CN

GCI 2008-2009 Score

3.5   4   4.5   5   5.5   6
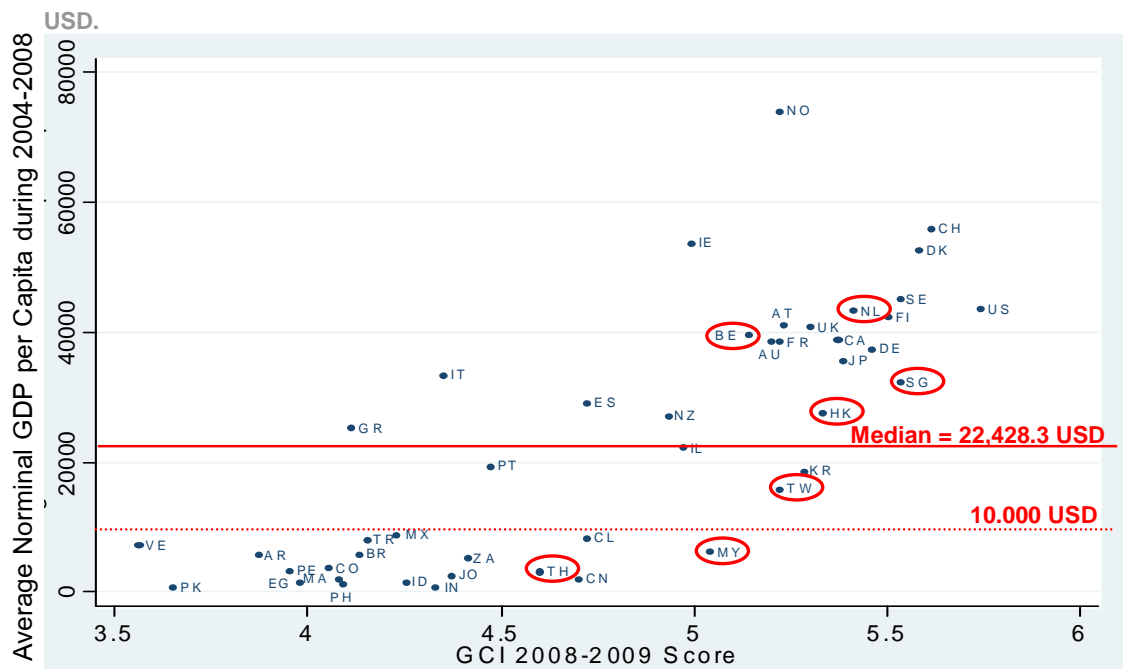
Note : Countries in the circles those with the ratio of exports to GDP over 50 percent
Source : World Economic Forum, World Economic Outlook (WEO) and CEIC

This belief is also supported by earlier research findings that the level of Total Factor Productivity (TFP) is highly correlated with trade openness.[37] In addition, as Thailand fared very poorly on the innovation aspect in the GCI, a shift toward production for the domestic market would undermine the economy's productive capacity as the export sector contributed significantly to capital accumulation, labor employment both inside and outside the export sector and was the main productivity provider as analyzed in III.3.

Moreover, there is also an important point of concern that a too fast expansion of domestic demand often leads to an unsustainable current account deficit through rising import demand. The experiences of Thailand and other regional economies from the Asian crisis continue to be a particularly essential lesson in this respect.

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[37] For example, Kidsom (2008) estimates the TFP levels during 1970-2004 among the OECDs and the selected East Asian Countries and finds significant positive correlations between TFP levels and trade openness in these groups.

Therefore, we conclude that the domestic market in Thailand is not big enough to replace demand from the foreign markets as a superior source of national income. Neither the population numbers nor the per capita income will likely be sufficiently large in the medium and longer terms. Besides, the Thai economy will still need to depend on the export sector for investment, employment and particularly productivity improvement.

IV.4 Appropriate role of domestic demand in enhancing further economic growth

Although domestic demand cannot replace exports as a more potent growth engine, we think there is still the need to strengthen domestic demand through structural reforms because of the following two main reasons. First, strengthening domestic demand would continue to be crucial in helping to cushion the economy during the cyclical downturn especially from external demand shocks as analyzed earlier. Second, there is still the need to expand domestic demand especially private investment to help spur growth through an increase in productive capacities.

Quantifying the magnitude of an appropriate expansion of domestic demand is not an objective of this paper. However, we think that there is

Picture 4.7 : Gross savings by type of savers
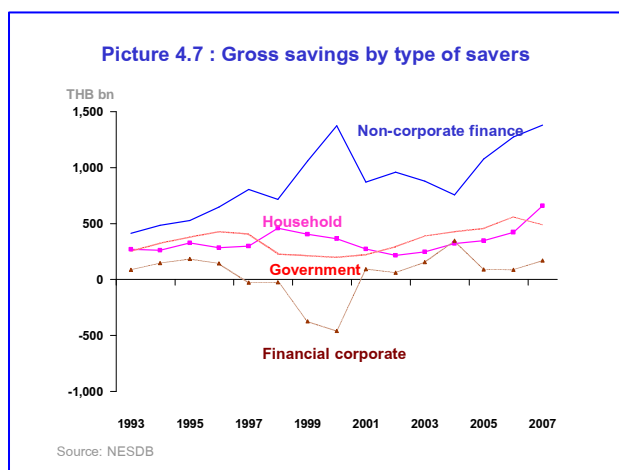
certain room for an expansion of domestic demand in the short and medium terms because private savings both in terms of household and non-financial corporate savings have increased drastically since 2002 as depicted in Picture 4.7. Therefore, ample saving should become an essential accommodative factor for consumption and investment when confidence resumes and the economy recovers. It will also help slow

the process of current account deterioration in the medium term future when export growth will likely be below the pre-crisis levels due to the likely gradual economic recovery in the G3 but imports will likely grow at a faster rate especially due to increasing imports for the government stimulus projects.

From comparing the room for investment versus consumption expansion in the short and medium terms, we assess that the room for an expansion of investment is greater than that of consumption. First, even though, the currently high level of household saving implies that consumption can expand further, the smoothness property of consumption indicates that the sustained path of consumption has to be in line with the path of GDP. Second, from comparing real consumption and real investment from the indices with the base year in 1980 as shown in Picture 4.8, the level of real investment in 2008 was equivalent to its level 16 years before in 1992 while consumption in 2008 was already 81 percent higher than in 1992. Although, this wide recovery gap is also attributable to overinvestment leading up to the Asian crisis and the much sharper drop in investment, it clearly demonstrates that investment, a supposedly important engine for the country at this developmental stage, has even lagged behind consumption in bolstering economic growth.
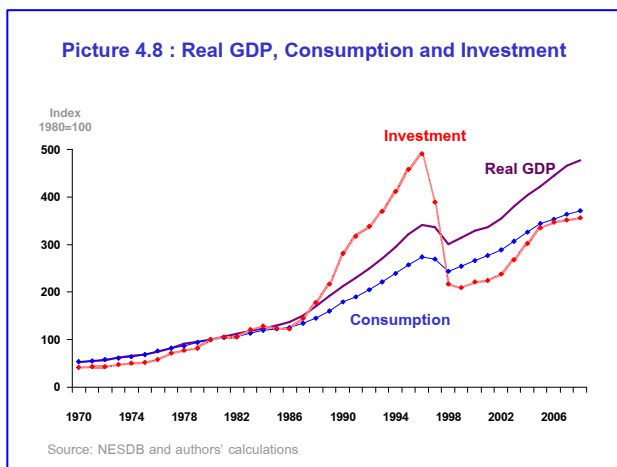
Picture 4.8 : Real GDP, Consumption and Investment

Index 1980=100

Investment

Real GDP

Consumption

Source: NESDB and authors' calculations

Therefore, we think that fostering investment is crucial for achieving the sustainable medium and long term growth for Thailand and it is essential to point out what are needed for enhancing investment in Thailand in the future period. In doing so, we base our analysis on three research works

regarding the determinants of private investment in Thailand by Decharux et al (2008) Mallikamas et al (2003) Jongwanich and Kohpaiboon (2008). (See the summary of their findings in Table 4.3) The above empirical studies, all of which employed the Errors Correction model, yielded similar findings that the main determinants of private investment in Thailand were in three main groups: prospects of returns, cost of investment, and expectation and confidence.

Among the determinants in the above three groups in Table 4.3, we deem that, in the short and medium terms, the most crucial factors would be political risks and public investment. As for the political risks, the rising political uncertainties have affected investors' and consumers' confidence significantly and led to the slowdown in investment as shown by the flattening slope of real investment since 2006 as shown by the indices with the base year in 1980 in Picture 4.9.

Picture 4.9 : Business and consumer confidence index

Index (LHS): 60, 55, 50, 45, 40, 35, 30
Index (RHS): 120, 110, 100, 90, 80, 70, 60

Business confidence index (LHS)

Consumer confidence index (RHS)

Jan-00 Jul-01 Jan-03 Jul-04 Jan-06 Jul-07 Jan-09

Source: BOT and The University of the Thai Chamber of Commerce
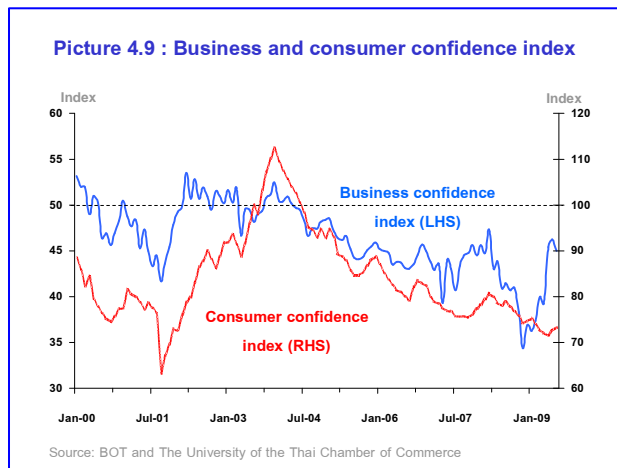
Table 4.3 : Determinants of Private Investment in Thailand

	Decharux, et.al.. (2008)	Mallikamas,et.al.. (2003)	Kohpaiboon. (2008)
Data	Quarterly:1997Q3-2008Q2	Quarterly:1995Q4-2003Q1	Yearly:1960-2005
Prospects of returns			
Market size/potential GDP	(+)	(+)	(+)
Rate of returns on investment	(+) growth of capacity utilization (-2)	(+) growth of capacity utilization (-2)	N.A.
	(-) change in debt to equity ratio	(-) leverage ratio of total liabilities to equities of non-financial firms in the stock market	
Public Investment	(+)△public investment(-1)	N.A.	(-)
Output gap	N.A.	N.A.	(+)
Exchange rate			(+) RER (baht depreciation)
Cost of investment			
Cost of capital	(-) Interest rate expense /interest-bearing debt	(-) Real MLR	(-) growth of real cost of capital
Availability of credit	(+) * △private credit growth(-1)	(-) * private credit growth (-1)	(+) △private credit/GDP
Exchange rate	(+)△REER(-1) (baht appreciation)		
Expectation and confidence			
Expectation and confidence	(+) Growth of Tobin's q (-2) (expected future retures over Tobin's q) (total liability+marketcap/total assets)		N.A.
Crisis	(-) crisis period 1997Q2-1999Q1	(+) pre-crisis 1996Q4-1997Q1	N.A.
Economic uncertainty	N.A.	N.A.	(-)
Political uncertainty	(+) dummy 2005Q3-2008Q2	N.A.	N.A.
Exchange rate volatility (vol)	(-) vol(-2)	(-)* REER conditional variance (-1)	

Note : (+) = refers to a positive impact on private investment

(-) = refers to a negative impact on private investment

 * = not statistically significant at 95%

RER is real exchange rate, REER is real effective exchange rate.

The important factor reflecting investment slowdown is the capacity utilization of the domestic market-oriented industries (less than 30% of production is for exporting) which stood at the highest level since the 1997 crisis in 2006 at 80 percent. This level of capital utilization should have prompted new investment in this industrial sector. However, the capacity index shown in Picture 4.10 demonstrates that new investment in this sector was low. In contrast, during 2006 to 2007, new investment in the export-oriented industries (more than 60% of production is for exporting)

Picture 4.10 : Capacity Index and Capacity Utilization

Capacity Index

Index (2000 = 100)

Export > 60%

Export < 30%

Export 30-60%

2000   2002   2004   2006   2008

Source: BOT

Capacity Utilization

Percent

Export < 30%

Export > 60%

Export 30 - 60%

1995 1997 1999 2001 2003 2005 2007 2009H1
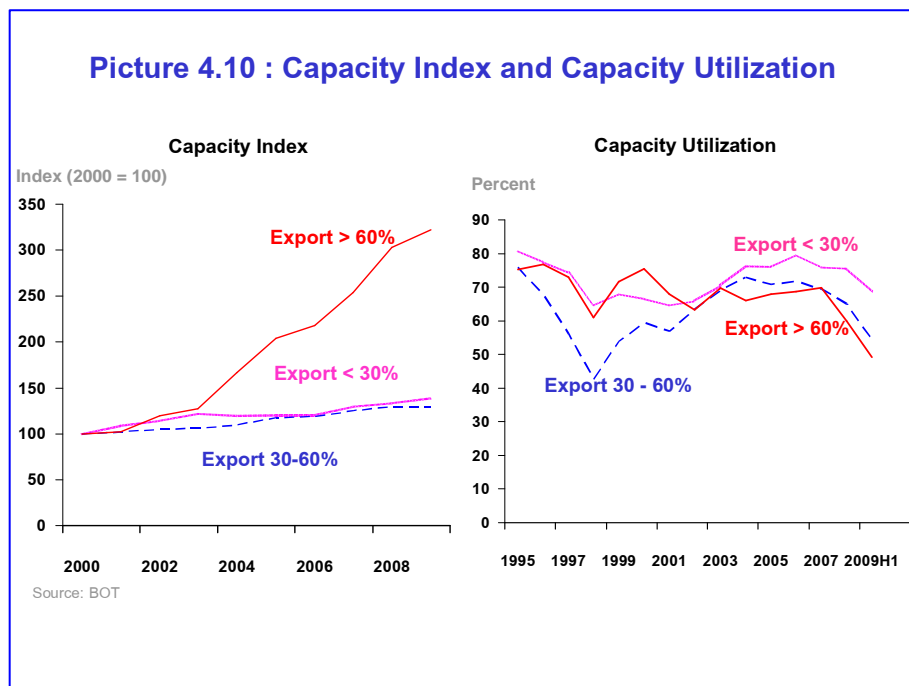
continued to rise considerably despite the significantly higher level of capacity utilization at 69-70 percent, implying that political risks were likely the crucial undermining factor for the domestic-oriented industries. Hence, improving investment confidence especially through the more stable political environment will be very important in buttressing domestic demand going forward.

As for public investment, it would be very crucial in the short and medium run as a momentum generator for economic recovery. This is because demand for exports from the G3 is expected grow only gradually in the medium term while consumption can not grow significantly faster than

GDP. Besides, public investment would help create significant crowding-in effect from private investment in the period of ample savings. More importantly, public investment in infrastructure and human capital is essential in facilitating and fostering the further stage of industrial development induced by globalization forces.

The last issue that needs to be raised in this part relates to the potential bias of the overall macro policies towards promoting exports as opposed to the domestic demand such as tax exemptions in favor of export activities and exchange rate policy emphasizing price competitiveness of export firms. These policies ought to be reexamined as they could affect the role of the domestic demand in boosting the economy in the short and medium terms and create distortions that could dent the long-term potential growth of the economy. This concern is related to several economic and policy variables and is largely subject to the evolving domestic and global economic environments beyond the scope of this paper. However, we think that several elements of this paper would be useful in for determining of the related policies in this avenue.

To summarize, the gap between net income generated by of domestic demand and exports has been narrowing. Since 1997, domestic demand has been less important than exports as the contributor to economic growth in Thailand. Furthermore, our analysis shows that the domestic market in Thailand would not be big enough to replace demand from the foreign markets as the source of national income in the foreseeable future. However, fostering domestic demand, especially investment is crucial for ensuring economic recovery as well as achieving the sustainable medium and long term growth for Thailand. Besides, domestic demand would need to assume the crucial role as a buffer against negative foreign demand shocks in the future.

V. Conclusion and policy recommendations

To answer the question of whether there is an alternative to export-led growth in Thailand, this paper starts by investigating the development of Thai exports and the importance of exports to the Thai economy followed by the assessment about the potential of domestic demand to replace exports as the main engine for economic growth.

We find that Thai exports have increased significantly for more than two decades. The important factors that have contributed to rising Thai exports include 1) Thailand's trade and industrial policies that have been geared toward export promotion, 2) the relocation of resource based labor intensive industries from East to Southeast Asia in the 1980s and the establishment of the IPNs of high-tech products in East and South Asia by the MNCs since 1990s, and 3) the US consumption boom in the 2000s as well as rising opportunities in the new markets such as China, India, and the Middle East.

Our analysis substantiates the importance of exports to the Thai economy. The export sector has been the significant provider of income for the economy as the total VA of Thai exports has increased continuously for the past 7 years particularly due to the fast rising export volume of high-tech products. More importantly, the export sector has made considerable contribution to the Thai economy as the most important engine of growth since 1997.

Export activities have also had substantial impact on the domestic demand including private consumption and private investment over time as it has been the important source of capital accumulation and employment of labor for the economy. On top of that, export activities have been the main contributor to the increasing productivity in the economy through the need

to compete in the global markets as well as positive externalities in terms of technological spillovers to other sectors.

However, we also find that relying on high-tech exports (accounting for 62.7 of total exports in the 2008) has made the economy vulnerable to the cyclical downturn of the trading partners. This is because these types of products have high income elasticity which leads to not only fast rising demand during the upturn of the trading partners' economies but also sharp contracting demand during their economic decline.

As for the role of domestic demand in driving growth, we assess that the domestic market in Thailand in terms of population and per capita income would be too small to replace demand from the foreign markets as the source of national income in the foreseeable future. Besides, the Thai economy will still need to depend on the export sector for investment, employment and particularly productivity improvement.

However, fostering domestic demand especially investment would be crucial for the economy as 1) domestic demand has always assumed and would need to perform the crucial role as a buffer against negative foreign demand shocks during the period of major crises abroad and 2) there is the need to expand domestic demand especially investment to help ensure economic recovery in the following period as well as achieve the sustainable medium and long term growth for Thailand.

Policy recommendations

The results of the paper lead us to point out five essential policy recommendations for macro policy making in Thailand going forward.

1) Better understanding about the characteristics of the product cycle of this product group will be crucial for not only export promotion policy but also for macro policy management in maintaining economic stability. This is because high-tech exports will continue to be the main income

generator for the economy especially during the up-cycle of the global economy ahead. However, the concentration of export composition on high-tech products will still expose the economy to the cyclical downturns of the trading partners' economies due to the high level of income elasticity of this product group.

2) With the rising level of global trade integration, it is likely that the trading partners' economic downturn would continue to be highly synchronized. Hence, in addition to ensuring a fiscal space for government stimulus policy, it is important to enhance resiliency of firms and workers in response to negative external demand shocks. The ability of firms to adjust costs and production during the period of adverse shocks, worker's adeptness in learning new skills, labor market flexibility, as well as an adequate and efficient social safety net system would be crucial as a shock absorber for the economy in the increasingly integrated world.

3) Strengthening domestic demand will be vital for the economy during the recovery and the future periods. In the short term, public investment will need to take the lead as it will provide incentives for new private investment. In the medium and long terms, favorable investment climate needs to be revived whereas costs of investment should not rise too rapidly and become an obstruction to economic expansion.

4) The drawbacks of the bias of the overall macro policies towards promoting exports at the expense of domestic demand such as the BOI privileges for export industries and the exchange rate policy that focuses on enhancing price competitiveness of the export sector need to be carefully studied as the on-going bias could affect long-term strength of domestic demand.

5) The key to ensure satisfactory growth performance over the long-term as well as enhance resiliency of the economy is to make certain that either exports or domestic demand can function properly as an engine of

growth at any time. Although, exports will likely have a more prominent growth enhancing role in the medium- to long-term future, to achieve sustainable growth and macro resiliency, strengthening domestic demand will also need to be a top priority of macro policy over the future time horizon.

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Appendix A: Computing the Elasticity of Thai Exports with Respect to Trading Partner Income

To estimate the elasticity of Thai exports with respect to trading partners' income (the results are shown in Part II), we use the same specification of export demand function as in ADB (2007). Following the ADB study, the log linear single-equation of export demand function[38] can be written as:

$$X_t = f\left(REER_t, Y_t\right) \tag{1}$$

where X_t is the volume of exports, the value of exports deflated by export prices, $REER_t$ is the real effective exchange rate[39] and Y_t is the real income of Thai trading partners. Since the data used in the estimation is time series which generally is non-stationary, its mean and variance will depend on time, the standard OLS regression procedures can easily lead to spurious results.

Hence, we start with an investigation about the stationary properties of the data. A univariate analysis of each quarterly time series was carried out by testing for the presence of a unit root using an Augmented Dickey-Fuller (ADF) test. All the variables are seasonally adjusted with the exception of $REER_t$ and the test is performed using data from 2000Q1 to 2009Q1. The results are shown in table A1.

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[38] In a small open economy like Thailand in which firms are price takers in the export markets, the volume of Thai exports is mainly induced by the foreign demand rather than the domestic supply of exports. Thus, we can use this reduce form specification in estimating the elasticity of Thai exports.

[39] REER is calculated as a weighted average of bilateral exchange rates between the baht and major trading partner currencies deflated by relative inflation to reflect the country's price competitiveness.

Table A1: Unit Root Tests

Variables	Augmented Dickey-Fuller Test			
	Level	Prob.	First Difference	Prob.
Total exports	1.49	0.96	-4.27	0.00
REER	-2.68	0.25	-4.48	0.01
TPGDP	-2.40	0.37	-1.52	0.10
Export sector				
Agriculture	-2.95	0.16	-7.01	0.00
Manufacturing	1.38	0.96	-3.95	0.00
Hi-technology	-1.80	0.38	-2.95	0.05
Resource base	-3.22	0.10	-7.46	0.00
Labor intensive	2.61	1.00	-2.86	0.06

Source: BOT and authors' calculations

It is found that all of these variables are non-stationary in the level but stationary in the first difference or they are integrated of order one I(1). To avoid the problem of spurious regressions occurring from using non-stationary data, we employ the cointegration and error correction approach proposed by Engle and Granger (1987). The procedure of this method is discussed as follows. First, we use OLS to estimate the long-run equilibrium relationship of the following form.

$$x_t = \alpha_1 + \beta_1 reer_t + \beta_2 tpgdp_t + \varepsilon_t \qquad (2)$$

Then, we obtain the residual of this estimation (ε_t). Next step, we perform an ADF test on the residual series to determine whether they are stationary. If we find that the residuals are stationary, then the variables are cointegrated, implying that there exists a long run relationship, and the equation is no longer spurious. The results are shown in table A2. Subsequently, the short-run equation can be estimated with the first difference of the dependent variable and the first difference of independent variables as well as the lagged residual of the long-run equation as regressors. The short-run equation can be written as follows:

$$\Delta x_t = \theta_1 + \varphi_1 \Delta reer_t + \varphi_2 \Delta tpgdp_t + \delta_1 ec_{t-1} + v_t \qquad (3)$$

where ec_{t-1} is the lagged residual of the long-run equation, δ_1 is the speed of adjustment in the short-run toward the long-run relationship, and v_t is a disturbance term.

Table A2 : Unit Root Tests of Residuals

Equations	Augmented Dickey-Fuller Test	
	Level	Prob.
Total exports	-2.41	0.02
Export sector		
Agriculture	-3.08	0.00
Manufacturing	-2.74	0.01
Hi-technology	-1.94	0.05
Resource base	-3.96	0.00
Labor intensive	-2.09	0.03

Source: Authors' calculations

Appendix B: Input-Output Analysis

The input-output model is an analytical framework developed mainly for analyzing the interdependence of industries in the economy. The most useful applications of an input-output analysis relate to the following examples of questions: "how would a change in demand in one industry affect the entire economy?" and "what would the direct and indirect value-added incurred in the economy for one additional baht of demand for agricultural goods?"

The input-output table (I-O Table) can help answer the aforementioned questions as it contains the fundamental information about transaction value of goods and services in the economy in the format shown in the sample figure below. The sample table is simplified from the input-output tables recorded by the Office of the National Economic and Social Development Board (NESDB). Values presented in Thailand's input-output tables are in unit of one thousand baht and measured for a particular year. As of September 2009, input-output transaction data are available every 5 years from 1975 to 2000. In addition, there are the tables for 1998 that were specially constructed to capture activities in the crisis period. The data of I-O tables can be categorized in many sectoral classifications such as 3, 16, 58 and 180 sectors. The 180-sector classification is the most detailed classification of NESDB's tables, representing the entire sectors in the economy.

Table 1: Input-Output Transaction Table

Unit: thousands of baht

			Intermediate demand (industry)					Final demand				Gross
			1	2	3	4	5	C	G	I	X	outputs
Intermediate inputs (industry)	Domestic	Agriculture										
		Manufacturing										
		Trade			(A)					(B)		(E)
		Transportation										
		Services										
	Import	Agriculture										
		Manufacturing										
		Trade				(D)						
		Transportation										
		Services										
Primary inputs	Value added	Labor	Wages and salaries					Gross Domestic Product
		Business owners	Operating surplus		(C)			= Total Value-added
		Capital	Depreciation					
		Government	Indirect taxes less subsidies					= Total Final Demand - Total Imports
Gross inputs		Total cost			(F)			

Source: Office of the National Economic and Social Development Board

How to read the transaction table?

The table can be divided into three main portions: intermediate inputs, final demands and primary inputs. The first portion labeled as "intermediate inputs" in Area (A) records the inter-industry exchanges of goods or services. Additional columns in Area (B) show "final demand" which represents the sales by each sector to final purchasers such as consumers and government agencies. The rows in the middle part of the table in Area (D) are imports of goods and services for intermediate uses and final demand. Additional rows below the imports shown in Area (C) are called "value added" or "primary inputs" which account for compensation for owners of non-industrial inputs in production such as wages and salaries for labor.

Each row in the table describes the distribution of a domestic producer's output throughout the economy. For example, the values of the first row refer to the values of agricultural goods that are contributed to other industries and constitute various forms of final demands. The last

value of that row labeled "gross outputs" in Area (E) is the summation of all values the industry contributes to the economy.

Each column in the table describes the composition of inputs required by a particular industry to produce its output. The values in the first column represent the inputs that agricultural sector requires in order to produce goods; for example, the production of cassava requires plants from agricultural sector, fertilizers and pesticides from the manufacturing sector, transportation from the transportation sector, utilities and finances from the service sector, and labors from primary inputs. These values, both of intermediate inputs and primary inputs, are the costs of production or the factors of production. The bottom values of each column in Area (F) thus refer to the total cost of production or total input. In equilibrium, the total value of input of each sector must be equal to the total value of output. In other words, the values of each sector in Area (F) must be the same values as in Area (E).

Mathematical structure of the input-output analysis

The construction of the input-output table is based on the most basic form of linear equations, describing the distribution of an industry's products throughout the economy. If the economy is divided into n sectors and if we denote X_i as total output of sector i or in Area E and F_i^d as domestic final demand F^d for sector i's product or in Area B, we can write the following linear equations of outputs, where z_i represents the inter-industry sales by sector i or in Area A.

$$X_1 = z_{11} + z_{12} + \cdots + z_{1n} + F_1^d$$
$$X_2 = z_{21} + z_{22} + \cdots + z_{2n} + F_2^d$$
$$.$$
$$.$$ \hspace{6cm} (1)
$$.$$
$$X_n = z_{n1} + z_{n2} + \cdots + z_{nn} + F_n^d$$

The right-hand side of the equations is thus the sum of all sector i's inter-industry sales and its sales to final purchasers, which is equivalent to total output on the left-hand side of the equations.

Assumptions and limitations of the model

Behind the simple system of linear equations in the I-O table, there are several embedded assumptions that users needed to be aware. Firstly, the I-O table analysis assumes that resources are unlimited. Secondly, each producer produces only one type of good. Thirdly, producers consistently use the same proportions of factors of production, implying that inputs are not substitutable in production. Lastly, all production has constant returns to scale. Therefore, firms cannot achieve lower costs per unit from producing more goods.

In addition, the I-O analysis also has two important limitations. The first limitation is that the I-O table analysis cannot separate changes in price and quantity. The problem from using into analysis may arise from changes in prices, which do not reflect changes in use of physical inputs. The second limitation of the model is its lack of feedback linkages between incomes and expenditures; for example, when an employee's income increases from additional demand, it has no further effect on expenditures in the economy.

Derivation of Leontief inverse matrix

To analyze "how much domestic output need to be produced to supply the need of final demand", the set of linear equations in (1) must be transformed in a certain way to have domestic output X_i as a function of final demand F_i^d, an exogenous variable as follows.

In the first step, as we have known that total output is equal to total input, the terms z can be rewritten as $a_{ij}X_i$, given that $a_{ij} = \dfrac{z_{ij}}{X_j}$. The subscript i refers to row sectors and j refers to column sectors. The a_{ij} terms, an input coefficient, describes the share of that input in sector i in the production of sector j. For example, if $z_{13} = 1,000$ and $X_3 = 50,000$, then $a_{13} = 0.02$. This value means the required inputs from sector 1 for the production in sector 3, which are equivalent to 2% of sector 3's total output. Now our summarized matrix can be written as:

$$X_1 = a_{11}X_1 + a_{12}X_2 + \cdots + a_{1n}X_n + F_1^d$$
$$X_2 = a_{21}X_1 + a_{22}X_2 + \cdots + a_{2n}X_n + F_2^d$$
$$\cdot$$
$$\cdot \qquad\qquad (2)$$
$$\cdot$$
$$X_n = a_{n1}X_1 + a_{n2}X_2 + \cdots + a_{nn}X_n + F_n^d$$

Moving the terms of intermediate inputs on the right-hand side of the equations to the left-hand side gives the following set of equations:

$$(1 - a_{11})X_1 + (-a_{12})X_2 + \cdots + (-a_{1n})X_n = F_1^d$$
$$(-a_{21})X_1 + (1 - a_{22})X_2 + \cdots + (-a_{2n})X_n = F_2^d$$
$$\cdot$$
$$\cdot \qquad\qquad (3)$$
$$\cdot$$
$$(-a_{n1})X_1 + (-a_{n2})X_2 + \cdots + (1 - a_{nn})X_n = F_n^d$$

This set of equations can be rewritten in the simple matrix algebra as the following.

$$(I\text{-}A)X = F \qquad\qquad (4)$$

where I is an identity matrix, A refers to the technical input coefficient matrix, X refers to the vector of gross output, and F refers to the vector of final demand.

$$A = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ . & . & . & . \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix} \quad X = \begin{bmatrix} X_1 \\ X_2 \\ . \\ X_n \end{bmatrix} \quad F = \begin{bmatrix} F_1^d \\ F_2^d \\ . \\ F_n^d \end{bmatrix}$$

Equation (4) can be written with the multiplication of Leontief inverse matrix $(I-A)^{-1}$ and final demand on the right-hand side of the matrix equation as shown in (5). This equation is the most important equation of the input-output model as the matrix $(I-A)^{-1}$ functions as the "output multiplier" that incorporates both direct and indirect impacts of interindustrial activities.

$$X = (I-A)^{-1} F \qquad\qquad\qquad (5)$$

With final demand as an exogenous variable in (5), the standard input-output model is presumably "a demand-side model" or "a demand-driven model" (Miller, 1985).

As the Leontief inverse matrix is with regular constant coefficients, final demand and domestic output are linearly related. Hence, we can measure domestic output that must be produced in response to an additional baht of final demand. More specifically, this inverse matrix allows us to figure out the value of domestic output that each sector needs to produce to meet final demand from sector j. For example, suppose that the tourism is expected to decline by 1 million baht as a result of an epidemic flu, apart from 1 million baht direct cutback in tourism (hotels and restaurants), this equation reveals its indirect negative impacts on food, beverages, retail trades, air and ground transports, hotels and restaurants itself and etc.

Appendix C: Calculation of Value Added

The total impact of final demand components on gross value-added (equivalent to gross domestic products) can be computed as follows.

$$V_k = \hat{v}\, \left(I - A^d\right)^{-1} F_k^d \tag{1}$$

For V_k is value-added of type (k) of final demand (F^d) of domestic goods and services, where k represents private consumption expenditure, government consumption expenditure, gross fixed capital formation, changes in inventory, and exports;

$\hat{v}$ is the diagonal matrix of value-added input coefficient,

$$\hat{v} = \begin{bmatrix} v_{\bullet 1}/X_1 & 0 & \cdots & 0 \\ 0 & v_{\bullet 2}/X_2 & \cdots & 0 \\ . & . & \cdots & . \\ 0 & 0 & \cdots & v_{\bullet n}/X_n \end{bmatrix},$$

$v_{\bullet j}$ is a value of primary input for production of sector j.

A^d is the diagonal matrix of domestic input coefficient.

The transaction values of value-added $v_{\bullet i}$, which denote primary inputs for production, are stored in the area (C) in Table 1. In a similar concept to the input coefficient matrix, $\hat{v}$ on the right hand side of (1) is a diagonal matrix consisting of ratios of value-added to total input. Thus, the multiplication of $\hat{v}$ is for converting total output to total value-added in the economy. This equation allows us to measure direct and indirect requirements of value-added to supply the need of final demand.

For the separate measure of direct requirements of value-added, the calculation becomes simpler by eliminating the Leontief inverse matrix from (1) as shown in the following equation:

$$directV_k = \hat{v} \ F_k^d \tag{2}$$

The direct requirement of value-added is the amount of primary inputs directly required to produce goods in the same sector. For example, if $v_{\bullet 3} = 0.60$, an increase in private consumption of 100 baht in sector 3 requires 60 baht of value-added from sector 3 alone. As now we have total and direct requirements of value-added, we can then evaluate indirect impacts from subtracting direct requirement from total requirement.

Income multiplier

Suppose we want to identify the requirement of value-added in each sector for an additional baht increase in each sector, we can modify (1) to a more simple equation form by letting final demand be an identity matrix rather than a certain final demand F_k^d. The modified equation can be summarized as following:

$$V_j = \sum_i (\hat{v} \ (I - A^d)^{-1}) \tag{3}$$

where V_j is a value-added for an additional baht of final demand in

sector j

Since both $\hat{v}$ and $(I - A^d)^{-1}$ are diagonal matrices (e.g. 5x5, 16x16, or 180x180), the outcome of the multiplication is also a diagonal matrix. Each column j of the multiplied outcomes describes value-added in each sector that is required for an additional baht of final demand in sector j. For example, given that one baht production of agricultural goods requires 0.7 baht of primary inputs (value-added), one additional baht of demand in the agricultural sector would indeed require 0.7 direct valued-added in the agricultural sector plus indirect requirements from each sector including itself, as industries are all interrelated in some way. Following the same concept of output multiplier, the summation of row values of the outcomes

in each column j can be expressed as a value-added multiplier or an income multiplier of sector j. Again, the term income multiplier of sector j is a multiplier of total income in the economy for final demand in sector j. For example, if income multiplier of the service sector is equal to 0.8, an additional baht of demand in service sector would generate 0.8 baht of total income (direct and indirect) to the economy.

Appendix D: Generating the series of value-added and import content of merchandized exports

In generating the series of value-added as well as import content of each sector, as the I-O tables are not available every year as mentioned in Appendix B, we need to use the previous available I-O table for computing both value-added and import content in the later years. For example, the 1998 I-O table is used for calculating value-added and import contents in 1998 and 1999, and the 2000 table is used for calculating value-added and import contents in the years after 2000. Hence, the limitation of this method is that the value-added of exports may not reflect the changing technology of production in the years during the absent years of I-O tables.

To compute the value-added from exports of goods, we map each item of exports in the harmonized system into its corresponding item in the input-output table (I-O table)[40]. After the series of exports and value-added items are matched into the items of the I-O table, we then calculate an export share of each item from the ratio to total export. Then, we multiply the export share to the value-added to obtain the value-added of exports in each sector.

For computing the series of import content from exports, we use the import content of each sector in the I-O table years from the I-O calculation as described in Appendix D. Then, we follow the same calculating steps as the calculation of value-added from exports as mentioned earlier in this appendix to obtain the series of import content from exports.

It needs to be noted here that the calculated value-added and import content in this study are associated with exports of goods only. Exports of

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[40] The items in the harmonized system include items 1-134, 136, 138, and 180 are mapped with the I-O table using the set of converter that we borrowed from the NESDB.

services are not included in this study because exports of services in the harmonized system are not detailed enough to be mapped into service sectors in the I-O table.

Appendix E: Calculation of Import Content

We can apply the I-O table concept to find total impact (direct and indirect) of final demand components on imports as follows.

$$M_k = A^m (I - A^d)^{-1} F_k^d + F_k^m \tag{1}$$

where M_k is an import value of certain type (k) of final demand (F)

where k represents of private consumption expenditure, government consumption expenditure, gross fixed capital formation, changes in inventory, and exports;

A^d is a diagonal matrix of domestic input coefficient;

A^m is a diagonal matrix of import input coefficient;

$$A^m = \begin{bmatrix} m_{11}/X_1 & m_{12}/X_2 & \cdots & m_{1n}/X_n \\ m_{21}/X_2 & m_{22}/X_2 & \cdots & m_{2n}/X_n \\ \cdot & \cdot & \cdots & \cdot \\ m_{n1}/X_n & m_{n2}/X_n & \cdots & m_{nn}/X_n \end{bmatrix},$$

m_{ij} is import value of an intermediate input of sector i for production of sector j as in Table 1's Area (D) in Appendix B;

F_k is final demand of type k, and its superscripts d and m refer to domestic and import.

To ease our understanding, we can treat the character A^m as the share of imports to total input. As the outcome of $(I - A^d)^{-1} F_k^d$ is total output, a multiplication of A^m with $(I - A^d)^{-1} F_k^d$ converts values from total output to total import content. Thus, the first group on the right-hand side of the equation $A^m (I - A^d)^{-1} F_k^d$ describes intermediate inputs of imports or import contents for sectoral productions. In addition to the first group, F_k^m refers to imports of goods directly for the final markets.

However, as the I-O tables are only available in some particular years, we then need to estimate imports of each GDP components for the years that tables are absent to generate the yearly series of import content of each GDP components since 1975. First, we compute an import share of each GDP component to the total import in the I-O table years. Then, we assume the ratios in missing years equal to the previous ratios that I-O tables are available. After having the data series of import share by each GDP component to the total import, we multiply the ratios with the National Account's nominal imports. Then, we deflate the series of imports of each GDP component by using the import deflator from the National Account to get the series of real imports of each GDP component.

There are two caveats for this calculation method. First, the growth of imports of each GDP components is always equal to the growth of National Account's real imports. Second, from the fundamental input-output analysis, the input-output analysis assumes that goods and services sold to final demand of type k are indifferent to those sold to other kinds of final demands. Thus, a one baht increase in private consumption would have the same total impact on the economy as an additional baht of government consumption or investment.

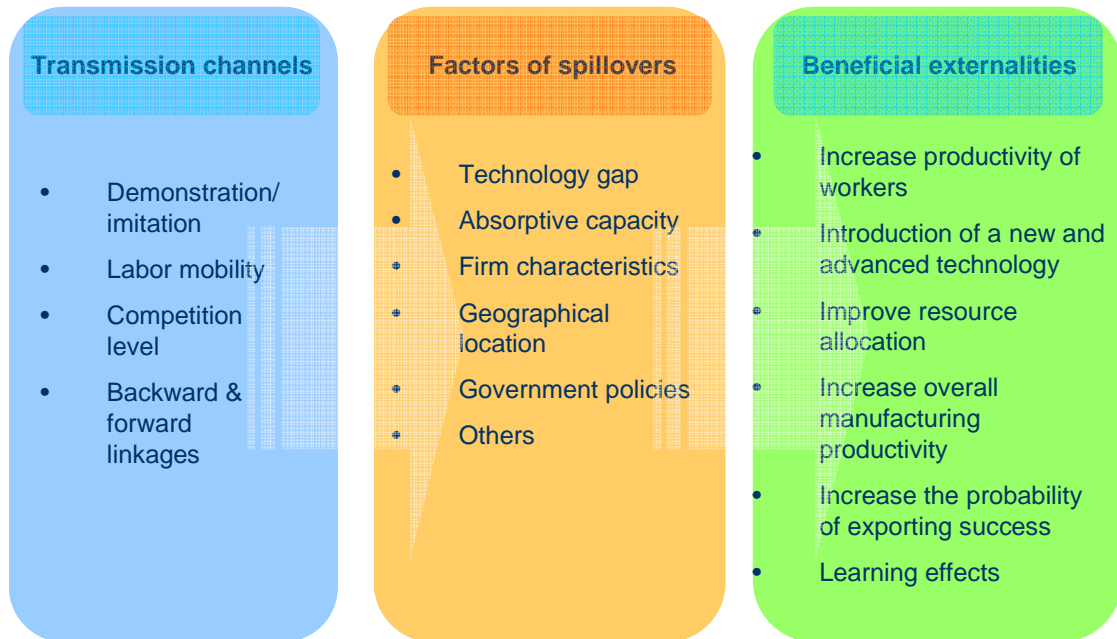# Appendix F: Calculation methods of total employment incremented from exports

The calculation of employment associated with export activities relies on two sources: the National Statistical Office of Thailand's Labour Force Survey and the Office of the National Economic and Social Development Board's input-output tables (I-O Table). We map employment data classified in 4-digits ISIC into 180 sectors of input-output tables. Thus, we have the series of employments classified into 180 sectors based on the input-output table's codes (I-O codes). Then, we calculate export shares of 180 sectors from the ratio of exports (I-O code 305) and gross output (I-O code 210) of each sector in the available I-O tables. Next, we estimate export share of the absent years in the I-O tables by using the shares of the previous year with official the I-O data; for example, for 1993 we borrow export shares of each sector from I-O table in 1990. Up to this point, our database has the series of employments and the series of export shares with the information from the official I-O data and mapped data. Both series are categorized into 180 sectors.

Next, we need to make our first assumption when we multiply an export share to employment of each sector by assuming that the share of employment in the export sector is equivalent to the share of export output to total output. In other words, within the same industry, export employees produce per-worker as many outputs as non-export employees. From the multiplications, we have the employment numbers of export sector in each sector. Total number of employment in the export sector or "the direct employment of exports" is the summation of each sector's export employment.

However, solely total employment in export sector is insufficient for capturing the employment associated with exports when we want to

investigate how many employments were incremented in the entire economy from exports in particular years. Thus, it is important to estimate the employment (both in export sector and non-export sector) that links with export sector. We introduced an application of the input-output analysis for the calculation. We firstly let the direct employment be the initial number and then extend total number of employment associated with exports from the direct employment by using output multiplier discussed in Appendix B. One of the properties of the output multiplier is that its value is always larger than 1 because 1 is a default value in the sector that is directly affected by 1-baht increase in final demand. In equilibrium, supply (input) is equal to demand (output), so 1-baht of total input needs to supply an additional baht of output's need. Thus, we can simply multiply output multipliers to the direct employments of each sector. The number of indirect employments associated with export activities is the difference between total employment incremented from exports and the employment in export sector.

Appendix G: Export Spillover Framework

Transmission channels	Factors of spillovers	Beneficial externalities
• Demonstration/ imitation • Labor mobility • Competition level • Backward & forward linkages	• Technology gap • Absorptive capacity • Firm characteristics • Geographical location • Government policies • Others	• Increase productivity of workers • Introduction of a new and advanced technology • Improve resource allocation • Increase overall manufacturing productivity • Increase the probability of exporting success • Learning effects

The diagram describes the process of how productivity[41] can spill from one export firm to others. The first block represents channels of transmission. Factors in the second block determine the success of the spillovers whereas the last block contains a list of beneficial externalities of the spillovers.

The transmission channels are ways that productivity could get transferred. The first important transmission channel is demonstration / imitation. This is one of the most common ways for firms to learn new and more advanced technologies from their partnerships or competitors. Because creating new technology is costly, firms prefer to adopt the technology that has been proven successful. Likewise, new exporters can

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[41] The term productivity displayed in this context also embodies the terms technology and knowledge.

enjoy such externality benefits by imitating other exporters to reduce the sunk costs of exporting[42] and increase the probability of exporting success.

Productivity can also be transferred via labor mobility when experienced workers who have expertise and tacit knowledge in particular areas move from more productive firms to less productive firms. Besides, an entry of productive firms like MNCs or more productive exporters also increase the level of competition in the domestic industry.

These aforementioned channels are regular channels for intra-industry spillover. But in the aspect of inter-industry spillover, both backward and forward linkages, productivity can be improved from various kinds of assistants[43] and quality standards required by partnerships.

However, not all economies enjoy the same degree of beneficial externalities from the export sector. A successful transmission of productivity from more productive (exporting) firms to less productive (non-exporting) depends on various factors[44] including technology gap, absorptive capacity, geographic location, and government policies.

Technology gap is a necessary condition because its existence means that there is higher level of technology available to be obtained. For example, exporter's interaction with more productive customers helps improve its productivity.[45] However, too wide technology gap would prevent technological spillovers to those who have learning constraints such as unwillingness, lack of knowledge and insufficient resources particularly finance. In addition, firm characteristics such as foreign ownership, size of

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[42] Sunk costs to enter international markets include an establishment of foreign networks, transportation arrangement, and knowledge of consumers' tastes in foreign markets, and an adjustment on product appearance suitably for foreign customers.

[43] Assistances can be in forms of technological assistance agreements, franchising, or management contracts.

[44] It is necessary to note that not all exports provide beneficial externalities to economy, but it may on the other hand create negative impacts on economy. (i.e. too intensive competition could eliminate less-competitive domestic firms and transfer domestic resources to a few of more-productive domestic firms or MNCs)

[45] See Jan De Loecker (2007).

firms in terms of sales and export capability also have an important role in supporting absorptive capacity.

Geography is also an essential factor for transmissions. Close location between suppliers in the clustering area can be an obvious positive geographic factor that allows firms not only to achieve greater economies of scale but also interact with business allies and competitors more frequently, so imitation, labor mobility and coaching can occur more regularly.

Moreover, government policies especially on trade and capital liberalization policy such as FDIs motivation, relaxation of the limitations on MNC ownership, and reduction of minimum requirements for the usage of domestic raw materials and domestic workers as well as legal infrastructure such as intellectual property rights also crucially determine the extent of productivity spillovers.

Appendix H: Structural Vector Auto Regression

The Structural Vector Auto Regression (SVAR) approach initiated by Sims (1986), Bernanke (1986) and Blanchard and Watson (1986) is an extension of the traditional VAR analysis. The difference is that SVAR attempts to identify a set of independent disturbances by imposing restrictions provided by economic theory. SVAR can be thought of as a tool with a connecting platform between economic theory and multiple time-series analysis. This method is frequently used, since it not only reduces the number of parameters estimated by traditional VAR, but also incorporates into the model relationships among variables that are consistent with economic theory. In this section, we utilize this estimation method in order to analyze the dynamic impact of export shocks to the Thai economy, especially on consumption and investment.

The SVAR procedure can be operated as follows. Suppose that the Structural form VAR is written in a matrix form as:

$$AX_t = C(L)X_t + F(L)Z_t + D\varepsilon_t \tag{1}$$

where A is the square matrix containing the structural parameters on the contemporaneous endogenous variables, $C(L)$ and $F(L)$ denote polynomials in the lag operator L which represent the dynamic structure, Z_t is the matrix of exogenous variables, D is the matrix containing the contemporaneous response of the variables to the disturbances or innovations, and let $E(\varepsilon_t \varepsilon_t^{'}) = \Sigma_\varepsilon$ be the variance-covariance matrix of structural disturbances.

Equation (1) can be transformed into a reduced form VAR as shown in equation (2)

$$X_t = B(L)X_t + G(L)Z_t + e_t \qquad (2)$$

where $B(L) = A^{-1}C(L)$, $G(L) = A^{-1}F(L)$ and $e_t = A^{-1}D\varepsilon_t$

We first start with the estimation of the reduced form VAR using OLS with four quarterly endogenous variables, namely Thai exports, imports, private consumption, and private investment, and two quarterly exogenous variables, namely trading partner GDP, which reflects the purchasing power of foreign counterparties, and Thai government expenditure. All the variables are in a logarithmic scale and seasonally adjusted. The estimation is performed by using the data from 1993Q1 to 2009Q1. To ensure no serial correlation from the residuals and avoid over-parameterization and hence losing important degrees of freedom for estimation, we choose optimal lag length of two quarters according to the Akaike, Schwarz, and Hannan-Quinn information criteria as common used in other studies. We also use the dummy variable to capture the Asian crisis period during 1997Q1 to 1999Q4.
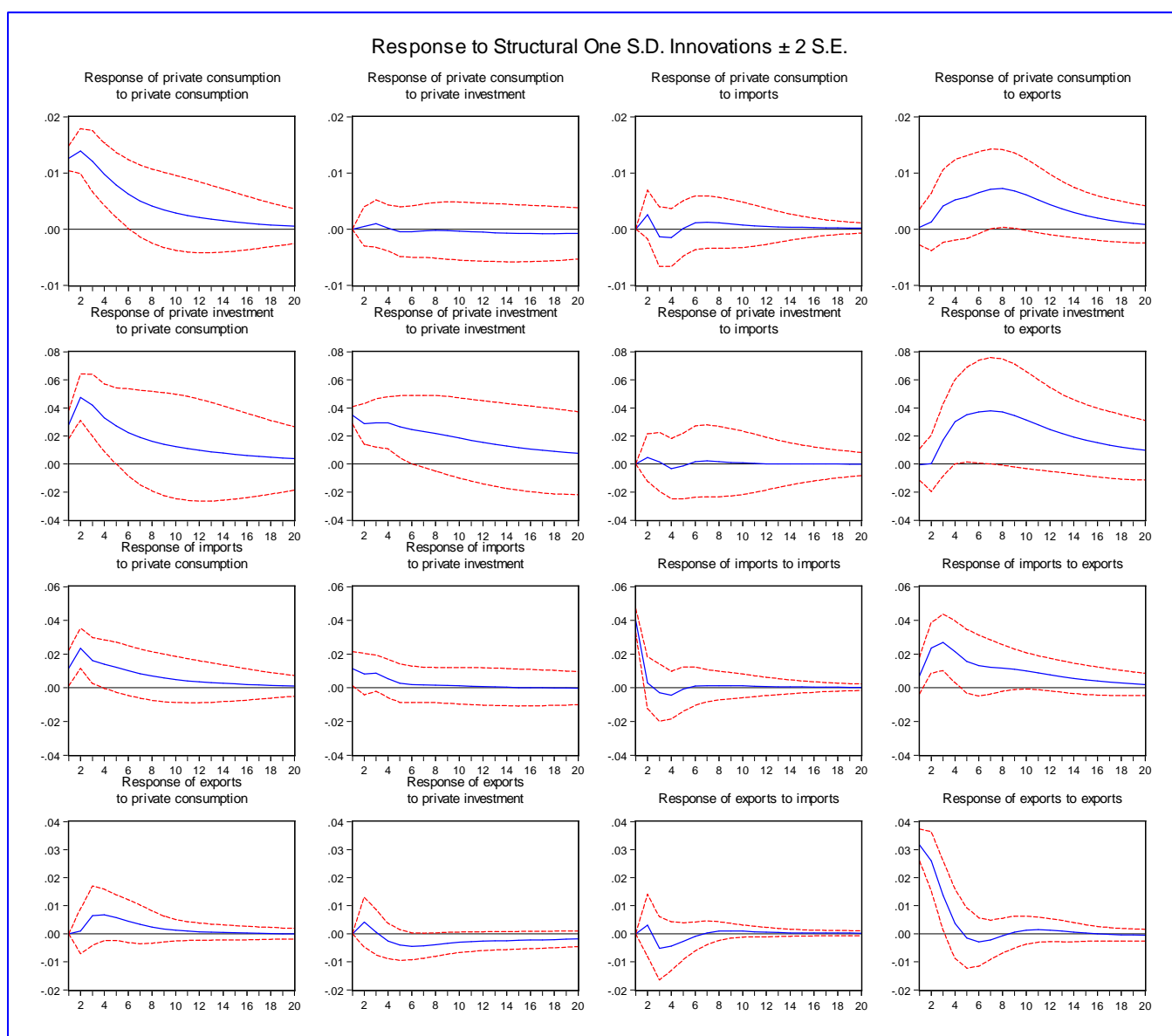
When the reduced form VAR is estimated it is then essential to impose sufficient restrictions (contemporaneous restrictions) on *A* to identify the structural parameters of the model. In a version of these four endogenous variables, there are $\left((k^2 - k)/2 = 6\right)$, where k is the number of endogenous variables, restrictions required for exact identification[46]. Thus, we employ identifying restrictions as follows.

$$
\begin{bmatrix} \varepsilon_X \\ \varepsilon_C \\ \varepsilon_I \\ \varepsilon_M \end{bmatrix} = D^{-1} \cdot \begin{bmatrix} 1 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 \\ a_{41} & a_{42} & a_{43} & 1 \end{bmatrix} \cdot \begin{bmatrix} e_X \\ e_C \\ e_I \\ e_M \end{bmatrix} \qquad (3)
$$

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[46] However, it is possible to impose more than the necessary restrictions according to economic theory, such that the model is over-identified (McCoy, 1997).

Where D is the orthogonal matrix to assume that the structural innovations are uncorrelated. The restrictions in our investigation are discussed in Part III.3. The results in terms of impulse response of each dependent variable to one standard deviation of shock to different dependent variables as well as variance decompositions of each dependent variable are shown below.

Impulse Response

Response to Structural One S.D. Innovations ± 2 S.E.

Variance Decomposition