

Acknowledgements

I would like to acknowledge my advisor Asst. Prof. Dr. Phattrawan Tongkunchum and my co-advisor Asst. Prof. Dr. Chamnein Choonpradub for their valuable advice and kind help throughout the completion of the thesis. Thank you to Dr. Tapanan Prateepko and Assoc. Prof. Dr. Halimah Benti Awang for being examiners of this thesis. I gratefully thank the Bureau of Policy and Strategy, Ministry of Public Health Thailand, for providing the data. Thank you to Graduate School, Faculty of Science and Technology, Prince of Songkla University, for providing the scholarship.

I would like to thank all lecturers in department of Mathematics and Computer Science.

Finally, I would like to thank my parents, sisters, brothers and friends for their support and encouragement throughout the study.

Nittaya Tongrong