

Time-series Analysis of Trends in Unemployment, Income Inequalities, and Suicide Mortality in Taiwan, 1959-2006



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APHA, 135 th Annual Meeting

Washington D.C., November 7, 2007

Middle-aged Suicide Deaths Double in Five Years

Asian Economic Recession Decreases Living Standard
Severe Unemployment
Inadequate Food
More Suicide Population

Anomy Status Causes Rising Suicide Rates

More People Call Hotline 1980 For Unemployment

Long-term Unemployed Men Jump Dead At 40

Young Unemployed Men Dead by Gas Suicide

後外出
子倒在
其右手
立即清

Family Murder-Suicide Case:
Unemployed son murders four family members before committing suicide

Nearly 1/5 Suicide Deaths Unemployed

Unemployed Father Murders Two Kids Before Committing *Suicide*

Prevent Suicide Risk; First Save Unemployment

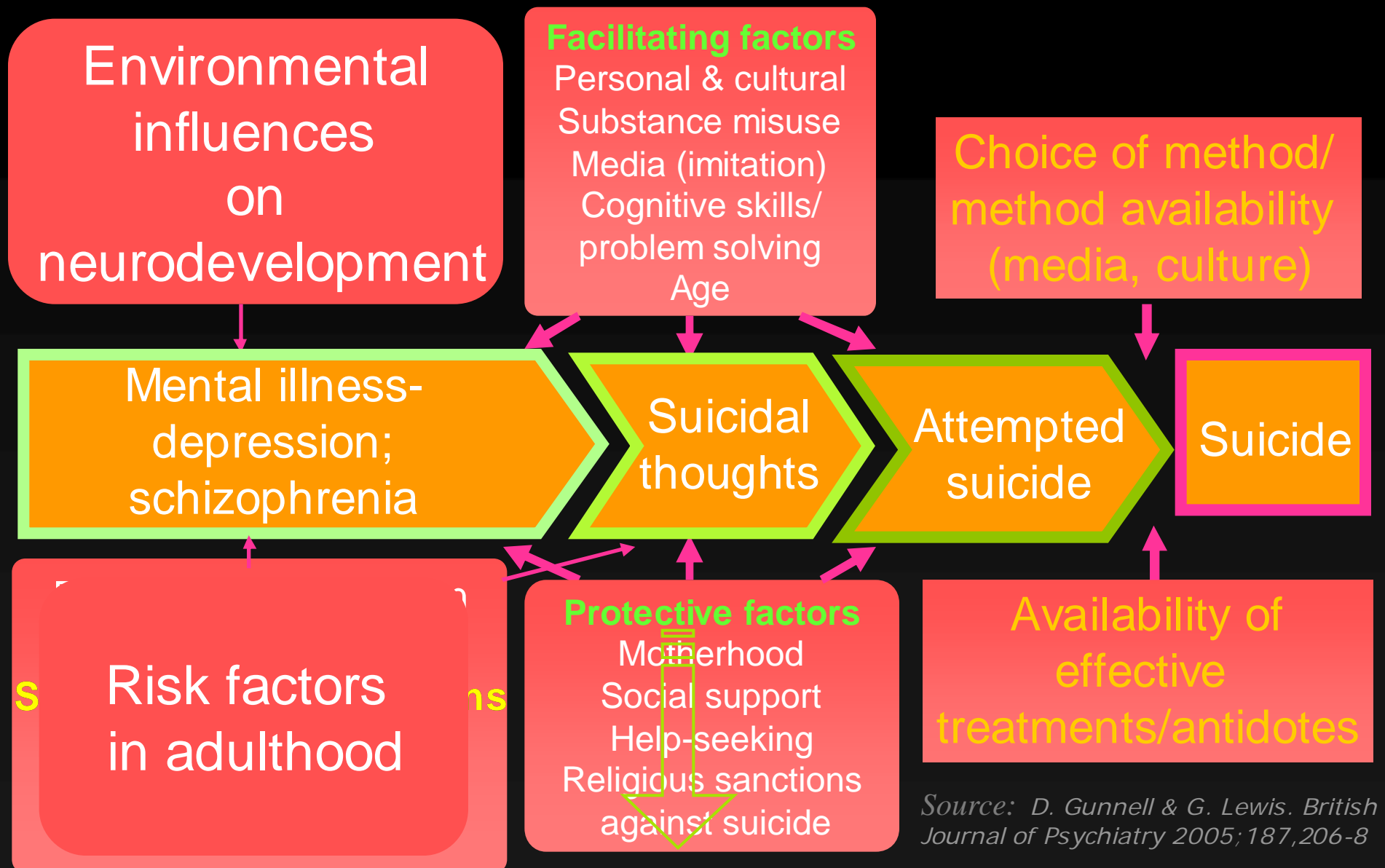
Objectives

✦ To understand the associations between suicide mortality and

- 1) Unemployment rate
- 2) Other economic factors
- 3) Income inequalities

Background & Significance

Life-course perspective on suicide



Changing patterns of suicide

✦ Durkheim, Anomie status

- Societal changes
 - ◆ Unemployment
 - ◆ Economic crises
 - ◆ Impersonality
 - ◆ Social fragmentation

✦ Income inequality

- Socio-economic deprivation

Existing literature on other socioeconomic factors and suicide

- ✦ Economical situation
- ✦ Income inequalities
- ✦ Labor participation

Hypothesis

- - ✦ Economic indicators other than unemployment rate may have stronger associations with suicide mortalities in Taiwan in recent years.

International comparison

| Country | Year | Male | Female |
|--------------------------------------|-------------|-------------|-------------|
| <i>U.S.A.</i> | 2004 | 17.7 | 4.6 |
| <u>Asian Countries</u> | | | |
| Japan | 2004 | 35.6 | 12.8 |
| <i>Taiwan</i> | 2005 | 28.0 | 12.3 |
| Republic of Korea | 2004 | 32.5 | 15.0 |
| China (Hong Kong SAR) | 2004 | 25.2 | 12.4 |
| China (Selected rural & urban areas) | 1999 | 13.0 | 14.8 |
| Thailand | 2002 | 12.0 | 3.8 |
| Singapore | 2003 | 12.5 | 7.6 |
| Philippines | 1993 | 2.5 | 1.7 |

*Data from the World Health Organization.1 †Most recent year reported as of December 2007.

Situation in Taiwan

✦ Industrial transformation

- Late 1950s
 - ◆ Rapid industrialization & modernization

✦ Current Statistics

- Mid 1990s-2006
 - ◆ Twice higher
- 1999-2006
 - ◆ The 9th leading cause of death

Materials

+ Official Materials

- Mortality data
- Unemployment rate
- Long-term unemployment rate
- Labor force participation
- GINI
- GDP
- Poverty rate
- Average disposable income per household of each fifth

Methods

✦ Methods

- Graphical approaches
- Time-series analysis

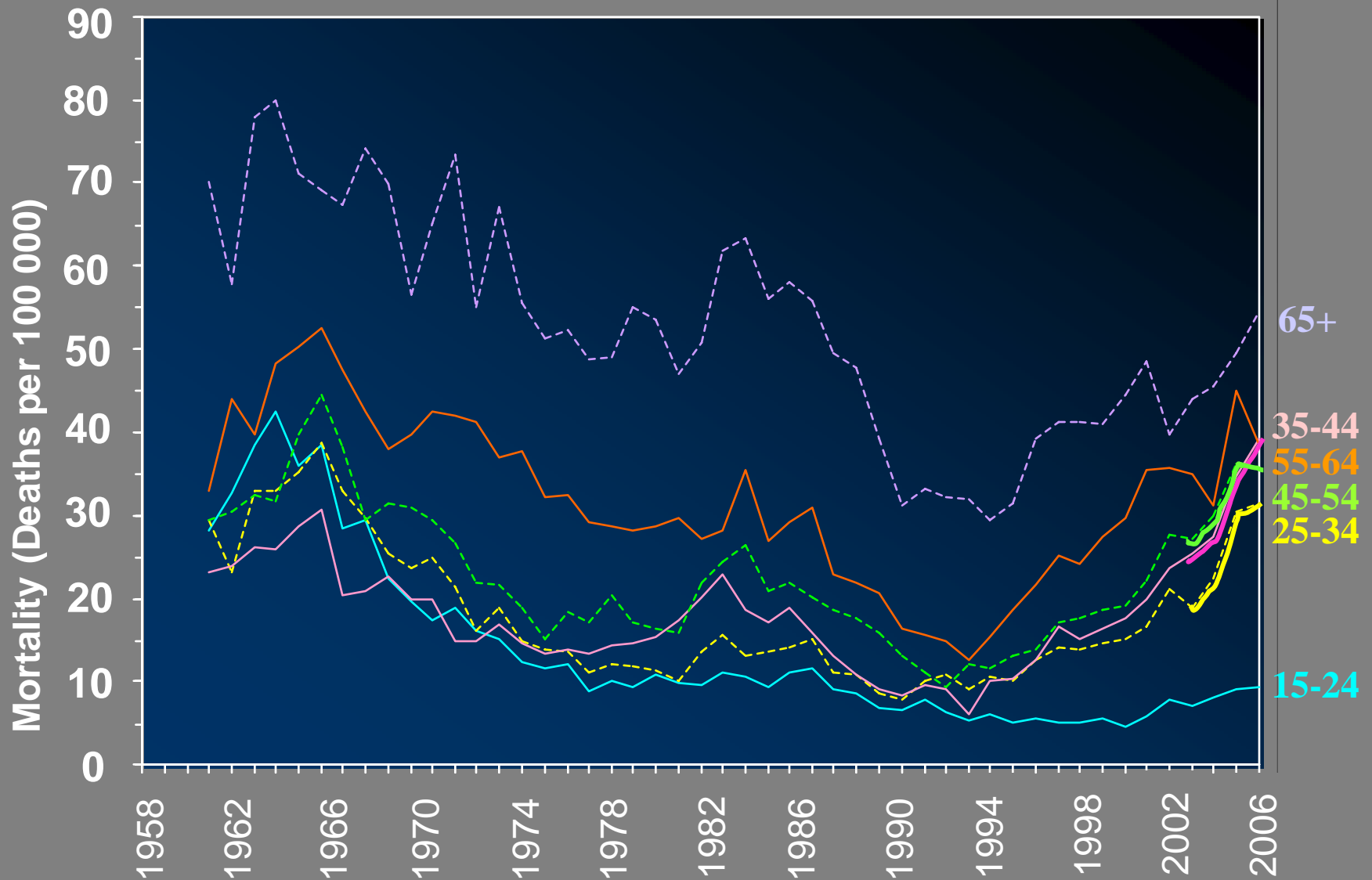
✦ Results of

- The associations between suicide mortality and unemployment
- Examination of important economic factors in Taiwan
- Other income-inequality factors

Results

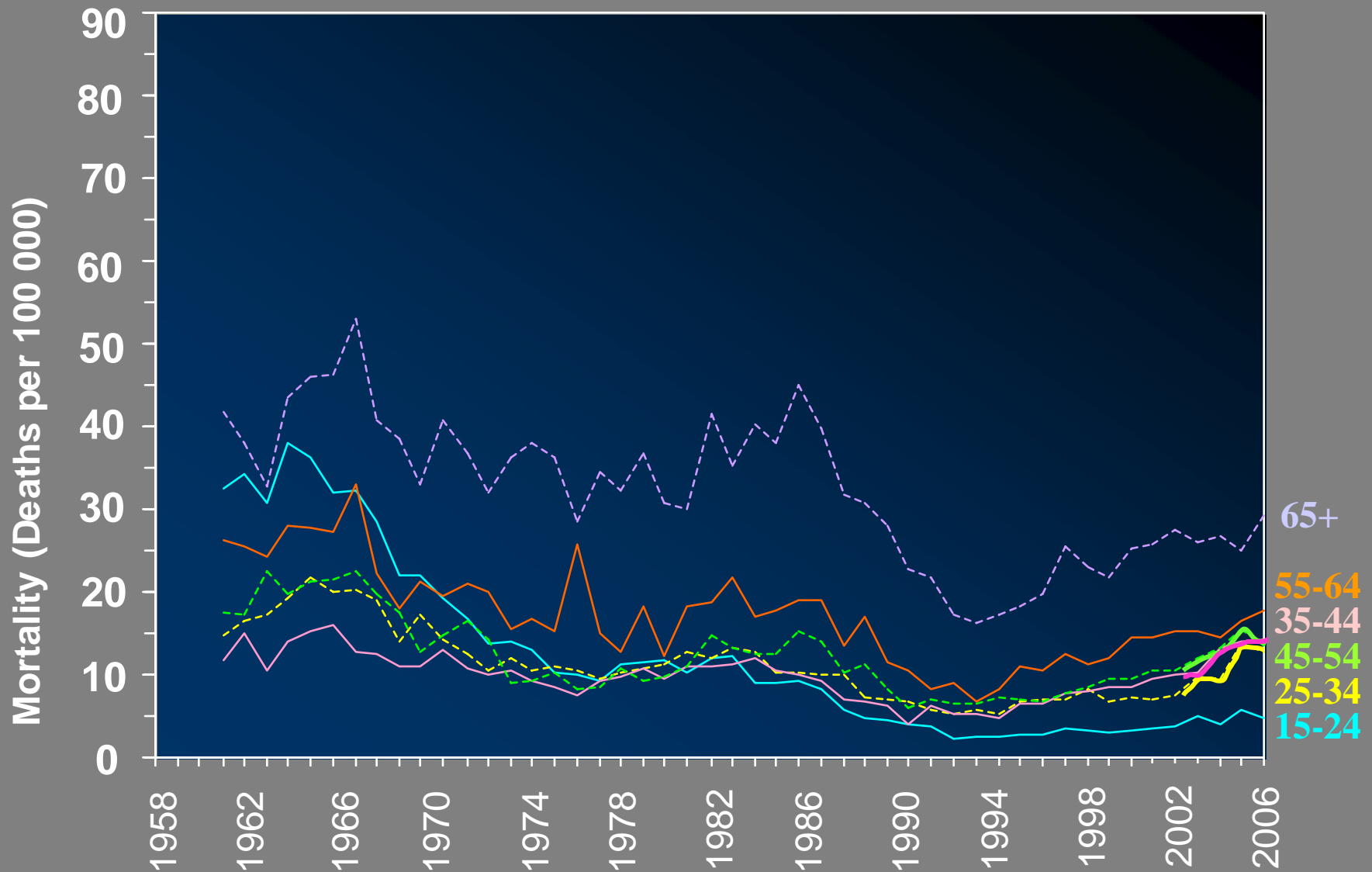
Suicide trends

Suicide mortality by age (Men)



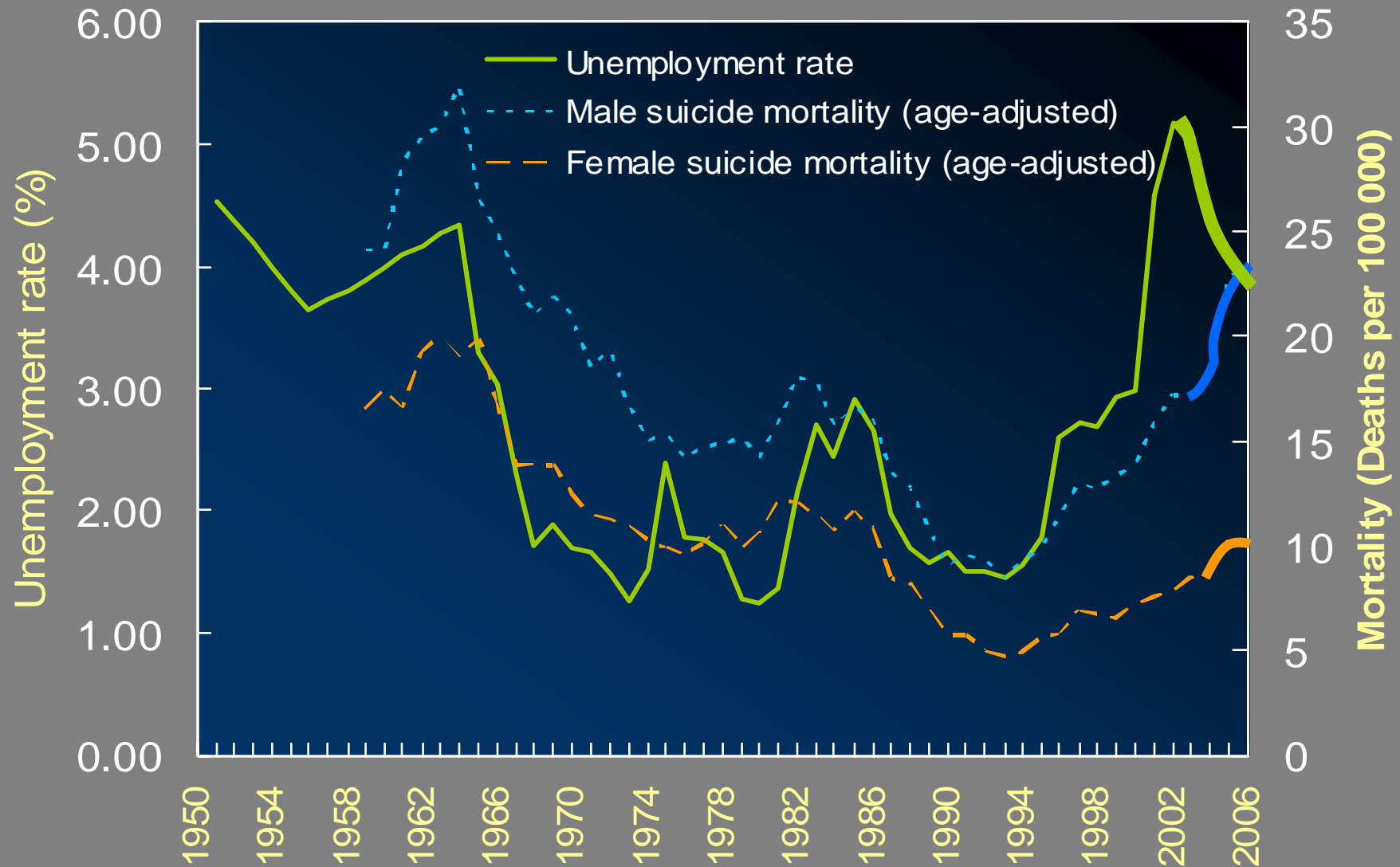
Suicide trends

Suicide mortality by age (Women)



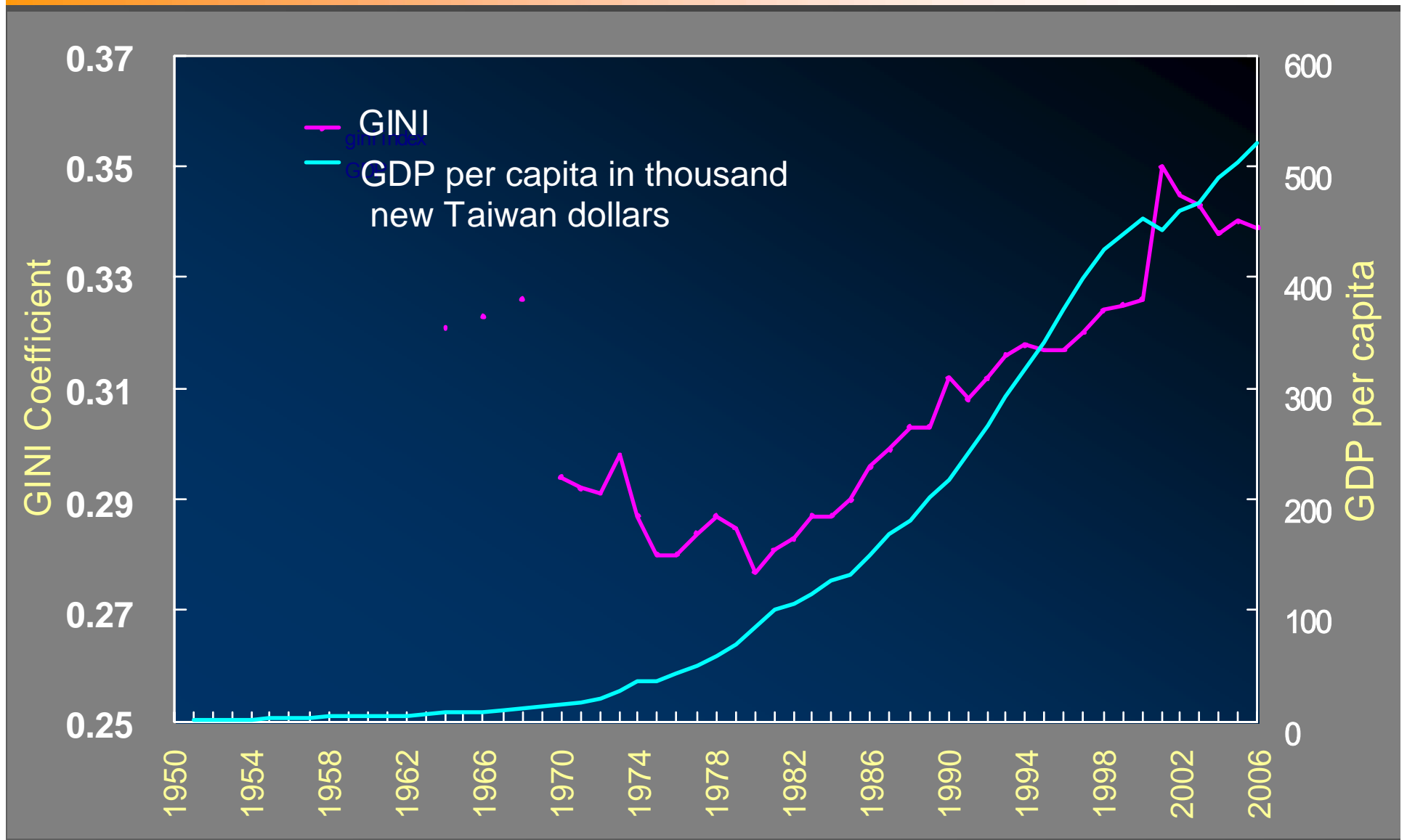
Trends in economic risk factors

Suicide mortality & Unemployment



Trends in economic risk factors

GINI & GDP



Time-series analysis

Cochrane-Orcutt Regression (Men)

| Suicide mortality | <i>total</i> | <i>15-24</i> | <i>25-44</i> | <i>45-64</i> | <i>65+</i> |
|---------------------------------|--------------|--------------|--------------|--------------|------------|
| Unemployment rate | 2.22 * | 1.5 * | 2.07 * | 4.77 * | 6.76 * |
| Men Labor Force Participation | 0.34 | 0.83 | 0.00 | 0.85 | 0.65 |
| Women Labor Force Participaiton | -0.39 | -0.34 | -0.54 | -0.45 | -0.92 |
| GINI coefficient | 0.00 | 0.04 | -0.05 | 0.02 | -0.04 |
| GDP | 2.69E-06 | -4.27E-08 | 1.13E-06 | 4.03E-07 | -1.13E-06 |
| R ² | 0.30 | 0.54 | 0.41 | 0.40 | 0.44 |
| Durbin-Watson statistic | 0.83 | 1.25 | 0.78 | 1.18 | 1.48 |

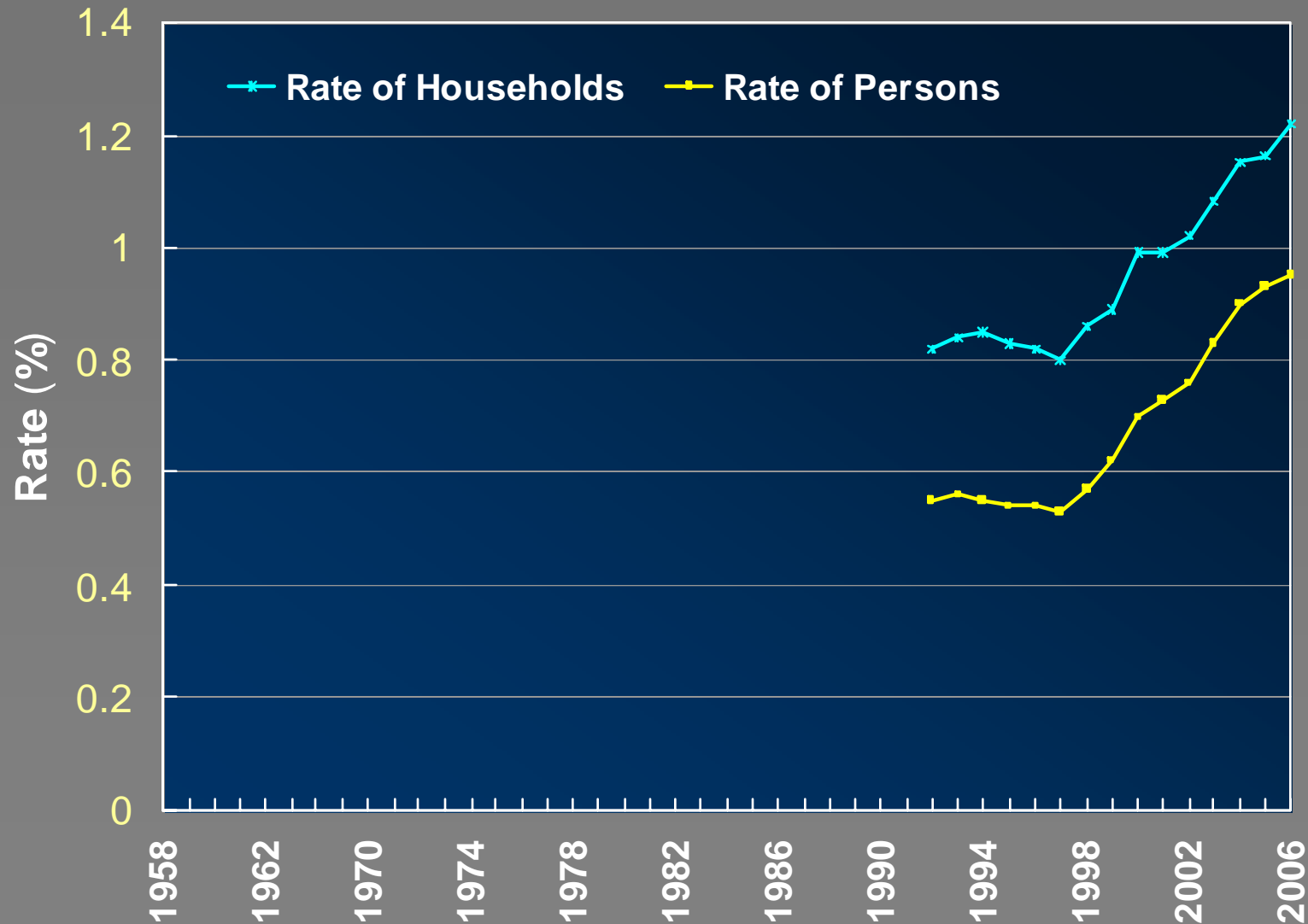
Time-series analysis

Cochrane-Orcutt Regression (Women)

| Suicide mortality | <i>total</i> | <i>15-24</i> | <i>25-44</i> | <i>45-64</i> | <i>65+</i> |
|---------------------------------|---------------|----------------|--------------|----------------|----------------|
| Unemployment rate | 1.20 * | 1.04 | 1.06 | 2.64 ** | 5.56 ** |
| Men Labor Force Participation | 0.09 | 0.32 | -0.00 | 0.81 | -0.38 |
| Women Labor Force Participaiton | -0.16 | -0.57 * | -0.18 | -0.24 | 0.35 |
| GINI coefficient | -0.03 | 0.04 | -0.06 | -0.06 | -0.20 |
| GDP | -1.57E-07 | -4.64E-07 | 1.81E-07 | 4.97E-07 | -1.99E-06 |
| R ² | 0.45 | 0.73 | 0.21 | 0.39 | 0.66 |
| Durbin-Watson statistic | 1.02 | 1.42 | 1.00 | 1.57 | 1.80 |

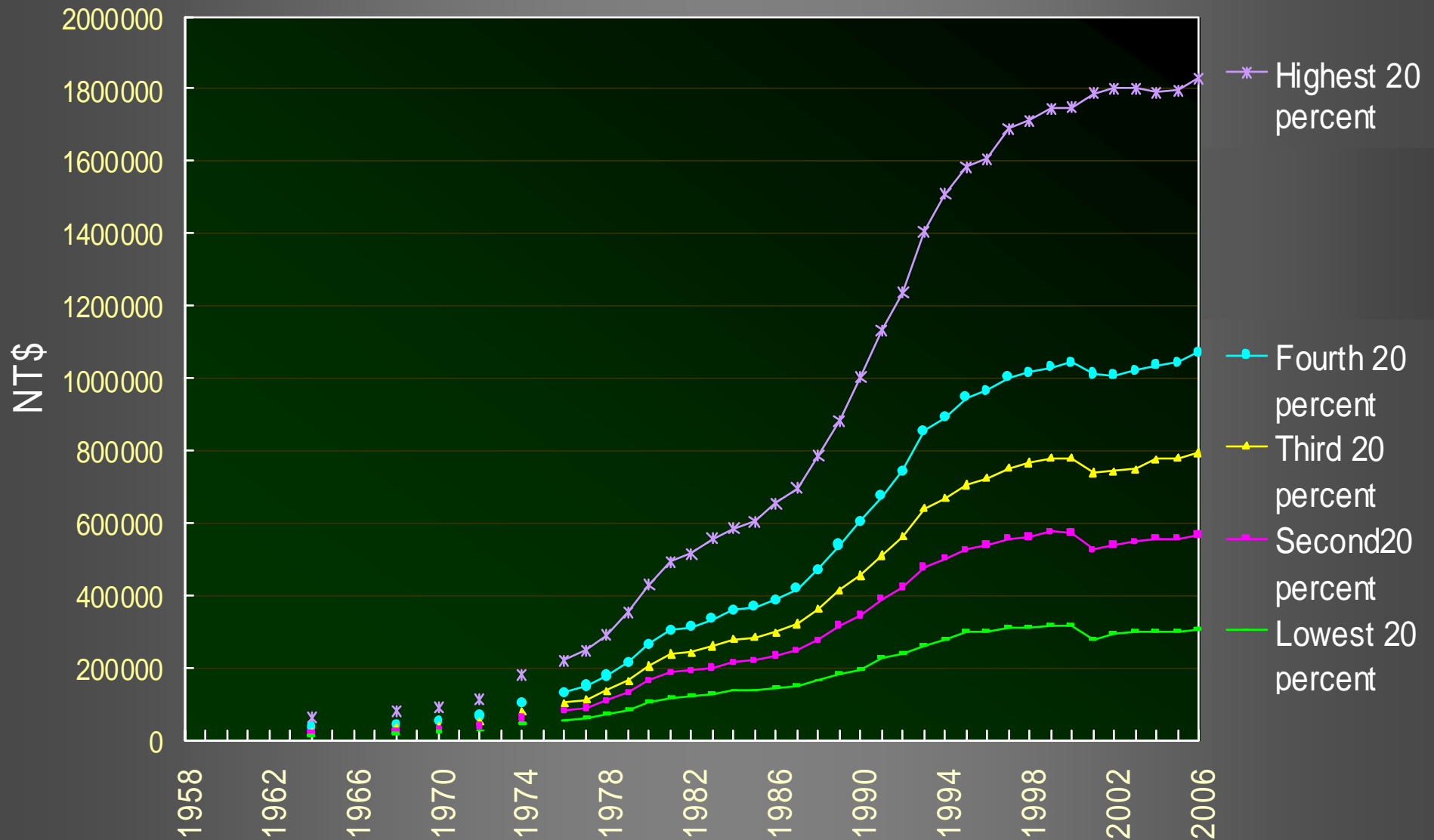
Trends in socio-economic risk factors

Poverty rate



Trends in socio-economic risk factors

Average disposable income per household of each fifth



Trends in economic risk factors

Long-term unemployment rate



Main Findings

✦ Whole Studied Periods

- Unemployment
 - ◆ All age groups: Elderly > Youth
 - ◆ Both genders: Men > Women

✦ Most recent decade

- Inconsistent associations between suicide mortality and unemployment rate
 - ◆ Income inequalities
 - ◆ Long-term unemployment rates
 - ◆ Economic factors

Conclusion

✦ Determining suicide mortality rates

- Recent years
 - ◆ Income inequalities
 - ◆ (Long-term) unemployment rate

✦ Future research

- Contextual complexity behind these associations
 - ◆ Work conditions
 - ◆ Employment flexibility

Policy Implication

- ✦ Inconvenient truth for the government
 - Employment flexibility
 - Poor working conditions
 - Insecure job
 - Working poor



Thanks for your attention.

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