

# **The impact of the second earner's income on income inequality in Taiwan, 1980-2006**

## **Abstract**

This study links the changes of household structure to analyze the second-earner's financial contribution to household income and its impact on the income distribution of households with at least two earners in Taiwan during 1980-2006. The empirical analysis of this study is based on the annual household income survey conducted by the Directorate-General of Budget, Accounting and Statistics (DGBAS). Findings of this study can be summarized as following: First, two-earner households have become a dominant contributory factor to overall household income inequality, while multi-earner households showed a decreasing contribution to total household income inequality. Secondly, there was a rising contribution of the second earner's income to household economy, relative to the contribution of the first earner's income. Besides, the income gap between the first and the second earners in multi-earner households was smaller than those in two-earner households. Thirdly, the first earner's income has widened household income inequality, while the second earner's income had equalizing effect on household income distribution among households with at least two earners during 1980-2006.

Keywords: income inequality, the second earner, household structure

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## **Introduction**

Researches on the causes of rising income inequality have been mounting steadily over the past two decades. We saw voluminous of literature looking into the contribution of household earnings, household head's earnings, or men's earnings to the inequality of family income (Daly & Valletta, 2006; Gottschalk, 1997; Gootschalk & Danziger, 2005; Jäntti, 1997). Most of these studies get similar conclusions that the increased household income inequality primarily reflects the greater inequality in household earnings, household head's or men's earnings. Jäntti(1997) found that increasing inequality of household head's earnings and higher shares of spouse's earnings in family income have accounted for much of the observed increases in income inequality in five western countries during the 1980s. Daly & Valletta (2006) also illustrated that the growing dispersion of men's earnings and changing family structure were responsible for most of the rise in family income inequality in U.S. during 1969-1989.

In addition, there has been a noticeably increase in the studies on the contribution of working wives to family income inequality in the United States and Britain since the 1980s. These researches investigated whether the rising household income inequality can be explained by increasing labor force participation of the married women. Most of these papers analyzed working wives' contribution to inequality among households with at least one married couple. There were mixed results in western literature about the impact of married women's earnings on household income inequality. In the United States, Betson and Gaag(1984) found that wives' earnings had an equalizing effect on household income distribution. Canican and Reed (1999), and Reed and Cancian (2001) concluded that the growing family income inequality was attributed primarily to changes in husbands' or males' earnings rather than other source of family income. In the United Kingdom, Borooah and McKEE (1996) also found that husbands' earnings were most responsible for the rise in household income inequality.

On the contrast, Bergamnn et al. (1980) showed that increasing married women's labor supply could widen family income inequality under certain conditions. Karoly and Burtless (1995) depicted that females' earnings have increased family income

inequality because these gains have been more concentrated in families with higher income.

In Taiwan, Liu and Chang (1987) examined the effects of wives' earnings on family income distribution during the period of 1977-1985. They concluded that wives' labor market activities have been an equalizing factor on family income distribution, though without significant historical trend. Besides, their study showed negative correlations between wives' earnings and other family income.

The distribution of family income in Taiwan has worsened since the beginning of the 1980s. In the same period, there also appeared obvious increase in the labor force participation of married women and noticeable change in household structure. The participation rate of married women hiked from 33 per cent to 50 per cent in 1980-2006. Thus, it is justified to analyze the causes of rising family income inequality by focusing on the changing household structure and earnings distribution of different household members. To explore the impact of changing household structure on income inequality, one has to split overall family income inequality among different groups of households. On the other hand, to analyze the impact of different types of income on family income inequality, one has to disaggregate total income inequality by different income sources.

The main purpose of this study is to link the changes of household structure to the contribution of the second earner's income to household income inequality in Taiwan during 1980-2006. In our empirical data, the household head is the one who contributes the most to support household economy, however, not necessarily the individual who has most income in a household. Besides, the household head owns overall imputed income. These two characteristics of our data seem not compatible with our research objective. So we re-define the definition of income to distinguish the first and the second earners. In this study, total household income is composed of wage income, self-employed income, property income and transferred income. Those with income greater than zero are defined as earners and their earned income<sup>1</sup> is the sum of wage income and self-employed income.

Following our research objective, two steps of investigation are employed. In the first step, all households are classified into five mutually exclusive categories in terms of household size and the number of household earners, including single elderly households, single non-elderly households, single-earner with more than one person households, two-earner households, and multi-earner households. In the second step, after evaluating the impact of different households on income inequality, we focus on the households with at least two earners to assess the contribution of the second earner's income on household income inequality.

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<sup>1</sup> In this paper, the first earner's and the second earner's income refers to earned income of theirs.

We organize the rest of this paper as follows. The second section will describe the data and methodologies used in this study. The third section shows the impact of different household groups on total income inequality. Then the results about the impact of the second earner's income on household income distribution among two-earner and multi-earner households are presented in the fourth and fifth section, respectively. Finally, the major findings of this study are summarized in the last section.

## **Data and Methodologies**

The empirical analysis of this study is based on the annual household income surveys conducted by the Directorate-General of Budget, Accounting and Statistics (DGBAS). These surveys were consistently undertaken since 1964, nevertheless, electronic data files for annual surveys including about 15,000 representative households were not available to public use until 1976. In Taiwan, family income inequality showed a U-typed pattern during the 1960s to 2006. Over the period of 1960-1980 saw a declining trend of income inequality; however, inequality had increased after 1980. Therefore, the time-series analyses of this study focus on household income inequality during 1980-2006.

Two steps of investigation are designed. First, all households are classified into five groups in terms of household size and the number of household earners. Then Theil decomposition by household types is used to calculate the contribution of each household group to total household income inequality. Secondly, since our research interest is to explore the impact of the second earner's income on household income inequality, we focus on two and multi earner households. Then, Gini decomposition by income sources is applied to assess the second-earner's contribution to household income inequality.

Figure 1 presents the percentage change of each household group during the period of 1980-2006. Although single-earner households constitute major part of all households, its share is declining, in contrast with the growing proportion of single households and two-earner households. Over the period 1980-2006, the proportion of single households and two-earner households increased from 3.8 per cent and 32.2 per cent to 10.5 per cent and 35.5 per cent, respectively. In 2006, single households were composed of 4.3 per cent non-elderly households and 6.2 per cent elderly households. During the same period, we saw an obvious fall in the proportion of single-earner households, from 47.3 per cent in 1980 to 40.9 per cent in 2006.

Following Food and Agriculture Organization(2006) and Goesling(2001),

Theil decomposition of household income can be expressed as

$$\text{Theil} = \sum_{k=1}^m y_m T_m + \sum_{k=1}^m y_m \ln(y_m / p_m) \quad (1)$$

where,  $m$  is an index of household types,  $p_m$  is the household share of the  $m$ th household to total households,  $\sum_{k=1}^m p_m = 1$ ; in addition,  $y_m$  is the income share of the  $m$ th household to total household income,  $\sum_{k=1}^m y_m = 1$ . Moreover,  $T_m$  is the Theil index of the  $m$ th of household.

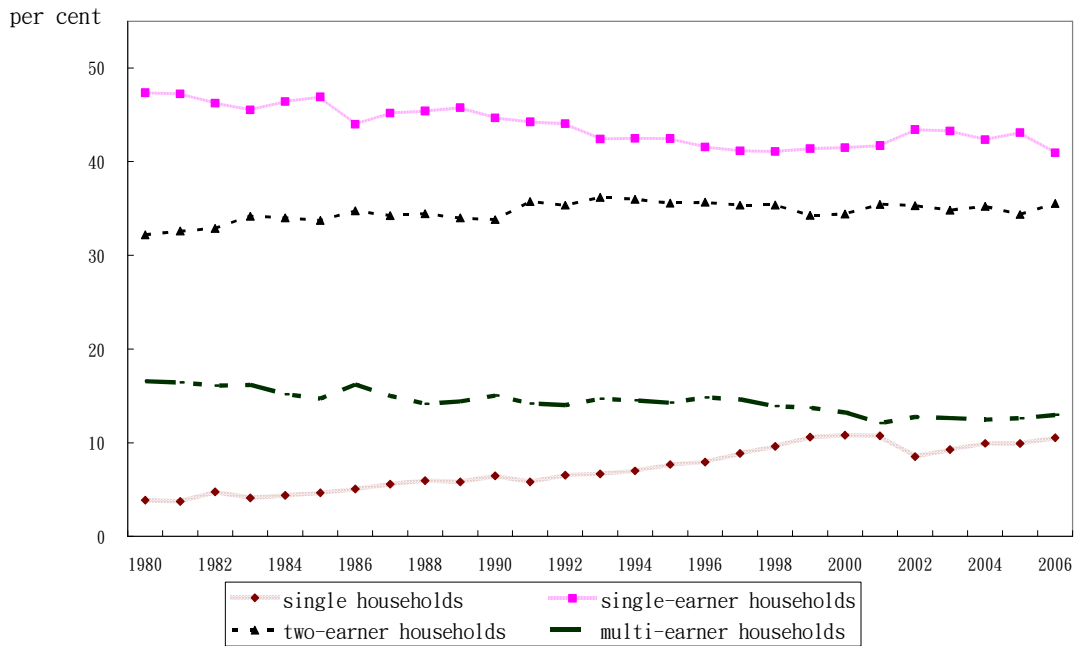
The first term in (1) is the weighted average of the Theil indices of each group ( $T_m$ ), with weights represented by the income share. This term is therefore the within element of the decomposition, while the second term in (1) is the between element of the decomposition.

The Gini decomposition by income sources was proposed by Fei et al(1978, 1979); then, it has been developed by Shorrocks(1982), Lerman and Yitzhaki(1985). In this study, the Gini decomposition of the household income,  $G_h$  can be written as following:

$$G_h = \sum_{k=1}^k S_k G_k R_k \quad (2)$$

where, subscript  $k$  refers to different income component of the household income, while  $S_k$  is component  $k$ 's share in total household income,  $G_k$  is the Gini coefficient corresponding to component  $k$ , and  $R_k$  is the relative correlation coefficient of income from component  $k$  with the distribution of total income, i.e.

$R_k = \text{Cov} ( y_k , F ( y ) ) / \text{Cov} ( y_k , F ( y_k ) )$ , where  $F ( y )$  and  $F ( y_k )$  are the cumulative distributions of household income and of income component  $k$ , respectively.



**Figure 1.** Composition of households in Taiwan: 1980-2006.

Sources of data: annual household income surveys conducted by DGBAS.

### The impact of household structure change on overall income inequality

This study uses Theil decomposition by household types to assess the contribution of each household group to total income inequality. Table 1 presents the results of Theil decomposition of household groups in 5-year interval during 1980-2006. Total inequality is partitioned into within group Theil and between group Theil as shown in column 6. There appeared an increasing inequality trend of total Theil index from 0.148 in 1980-1984 to 0.201 in 2005-2006<sup>2</sup>. In the same period, the within group Theil index moderately rose from 0.12 to 0.132, while the between group Theil index significantly increased from 0.027 to 0.069. This results may be explained by increasing impact of household heterogeneity on income inequality.

Further income inequality investigation of each group reveals that Theil index has increased from 0.165 to 0.203 for single non-elderly households, and from 0.13 to 0.175 for one-earner households (please refers to the first and the third column). In contrast, Theil index of single elderly household and multi-earner households fell from 0.297 and 0.108 to 0.164 and 0.085, respectively. It is quite possible that single elderly households are becoming more equally poor, and multi-earner households are getting more equally rich. The inequality of two-earner households reveals no

<sup>2</sup> The results of annual Theil decomposition is presented in Appendix Table 1.

significant historical trend.

**Table 1.** Theil inequality decomposition of household groups in Taiwan during 1980-2006.

	Single Non-elderly household		Single elderly household		Single-earner household		Two- earner household		Multi- earner household		Theil decomposition		
	Income share	Theil	Income share	Theil	Income share	Theil	Income share	Theil	Income share	Theil	Within-group Theil	Between-group Theil	Total Theil
1980~1984	0.016	0.165	0.003	0.297	0.396	0.130	0.357	0.116	0.228	0.108	0.120	0.027	0.148
1985~1989	0.018	0.206	0.005	0.206	0.375	0.141	0.379	0.122	0.224	0.095	0.125	0.038	0.163
1990~1994	0.019	0.292	0.006	0.238	0.340	0.144	0.409	0.114	0.225	0.088	0.122	0.045	0.167
1995~1999	0.025	0.201	0.010	0.143	0.324	0.148	0.417	0.107	0.224	0.082	0.118	0.059	0.176
2000~2004	0.030	0.231	0.010	0.174	0.321	0.172	0.433	0.125	0.205	0.092	0.137	0.067	0.204
2005~2006	0.030	0.203	0.011	0.164	0.318	0.175	0.433	0.117	0.208	0.085	0.132	0.069	0.201

Sources of data: own calculations.

To trace the contribution of each household type to within- and between group inequality, we proceed to calculate contribution index of each household. Our study found that two-earner households have become a dominant and increasing contributory factor to overall household income inequality in Taiwan. As expressed in equation (1), within group Theil is the sum of each household's Theil times income share, so the within inequality contribution index of each household is closely related to household's income share. As presented in Table 2 , the contribution of one-earner household constitute the largest portion of the within inequality index, its contribution index was about 0.40 to 0.42 during 1980-2006. If time interval was divided into the 1980s, the 1990s and the 2000s, there appeared an increasing contribution to within Theil index of two-earner households. For example, within Theil contribution index of two-earner households rose from around 0.35 in the 1980s to about 0.39 in the 2000s. On the other hand, multi-earner households have an equalizing impact to within Theil index, its contribution index fell from 0.203 in 1980-1984 to 0.133 in 2005-2006.

**Table 2.** Contribution of different households to within-group Theil index in Taiwan, 1980-2006.

Period	Single non-elderly household	Single elderly household	Single-earner household	Two-earner household	Multi-earner household	Sum
1980~1984	0.022	0.006	0.426	0.343	0.203	1
1985~1989	0.029	0.008	0.423	0.369	0.171	1
1990~1994	0.046	0.011	0.400	0.381	0.162	1
1995~1999	0.043	0.012	0.409	0.379	0.157	1
2000~2004	0.051	0.013	0.403	0.394	0.138	1
2005~2006	0.046	0.014	0.422	0.385	0.133	1

Sources of data: own calculations.

Between group inequality contribution indices of different households are in Table 3. The results show an obviously opposite trend between two-earner and multi-earner households. Over the period of 1980-2006, the former households had an increasing contribution to between Theil index from 0.96 in 1980-1984 to 1.34 in 2005-2006, while the latter households displayed a decreasing impact from 2.96 to 1.46 in the same period.

**Table 3.** Contribution of different households to between-group Theil index in Taiwan, 1980-2006.

period	Single Non-elderly household (A)	Single Elderly household (B)	Single-earner household (C)	Two-earner household (D) <sup>a</sup>	Multi-earner household (E) <sup>a</sup>	Total A+B+C+D+E
1980~1984	-0.012	-0.003	-0.064	0.026 (0.96)	0.080 (2.96)	0.027
1985~1989	-0.013	-0.006	-0.072	0.038 (1)	0.091 (2.39)	0.038
1990~1994	-0.013	-0.008	-0.080	0.051 (1.13)	0.095 (2.11)	0.045
1995~1999	-0.018	-0.013	-0.081	0.070 (1.18)	0.101 (1.71)	0.059
2000~2004	-0.021	-0.014	-0.090	0.091 (1.35)	0.100 (1.49)	0.067
2005~2006	-0.021	-0.015	-0.088	0.093 (1.34)	0.101 (1.46)	0.069

Sources of data: own calculations.

a: figures in parentheses are divided by total between-group indices.

## Overview of households with at least two earners

Since our research interest is to explore the impact of the second earner's income on household income inequality, and the second earners only exist in two-earner and multi-earner households, only two-earner and multi-earner households will be



investigated in this and next sections. Besides, we differentiate household income into the first earner's income, the second earner's income and other household income.

Since there might be heterogeneous between two-earner and multi-earner households, and as Riihelä, Sullström and Tuomala (2005) described, changes in relative values of different income sources have large effects on the overall distribution, this section will present who are the second earners and show how important are the second earner's income in two-earner and multi-earner households.

Table 4 shows the composition of the second earners in two-earner and multi-earner households in 1980 and 2006. According to DGBAS's definition, the household head was not necessarily the person who has most income in a household, but he contributes the most to support household economy.

In two-earner households, the second earners consist of 7.3 per cent of household heads, 56.9 per cent of spouses, 22.06 per cent of sons and daughters of household heads, and 13.7 per cent of other household members in 1980; while in 2006, these ratios became 14.06 per cent, 54.68 per cent, 13.68 per cent, and 17.58 per cent, respectively. Apparently, female spouses constitute major proportion of the second earners in both 1980 and 2006. Yet the proportion of household heads as second earners rose from 7.3 per cent in 1980 to 14.06 per cent in 2006. Since the proportion of female heads as second earners has increased greatly from 18 per cent to 28 per cent during 1980-2006, while the proportion of female spouses only slightly decreased from 96 per cent to 92 per cent in the same period. We can conjecture that female or wives' income contribution to household economy has become more important.

Among multi-earner households, sons and daughters are the most important sources of the second earners; however, there was a noticeable decrease from 55.2 per cent in 1980 to 36.1 per cent in 2006, their proportions in contrast with an obvious increase in the proportion of household heads and spouses. Since the proportion of female household heads as second earner also increased a lot and the female spouses as the second earner only slightly decreased during 1980-2006, that led to greater economic contribution to household income by female heads or wives among multi-earner households.

**Table 4.** Composition of the second earners in two-earner and multi-earner households in Taiwan, 1980 and 2006.

	two-earner households		multi-earner households	
	1980	2006	1980	2006
household head <sup>a</sup>	7.3	14.0	8.7	16.9
Spouse <sup>b</sup>	56.9	54.6	11.6	20.4
Sons and daughters	22.0	13.6	55.2	36.1
fathers and mothers	5.6	9.7	4.7	8.9
brother and sister	7.1	5.9	17.3	14.5
other member	0.9	1.8	2.3	3.0
sum	100.0	100.0	100.0	100.0

Sources of data: own calculations.

a: the proportion of female heads increased from 18% to 28% in two-earner households and from 9% to 24% in multi-earner households during 1980-2006.

b: the proportion of femal spouses decreased from 96% to 90%, and from 96% to 92% in two-earner and multi-earner households, respectively during 1980-2006

Karoly & Burtless (1995) found that increasing females' earnings have worsened household income inequality because these gains have concentrated in families with higher income. This study explores the economic contribution of the second earner's income relative to the first earner's income and also to the total household income by the first earner's income quintile among two-earner and multi-earner households in Taiwan during 1980-2006.

Three findings from Table 5 can be summarized. First, regardless of two-earner or multi-earner households, and whether in 1980 or in 2006, the ratios of the second earner's income to the first earner's income showed a descending order. Although the absolute amount of the second earner's income in top quintile might be larger than that in the bottom quintile, there appeared no direct evidence showing that the second earner's income was concentrated in households with higher first earner's income. Secondly, the ratios of the second earner's income to that of the first earner's income in multi-earner households are always higher than those in two-earner households. That means the income gap between the first and the second earners in multi-earner households was smaller than that in two-earner households. The income distribution of income among different earners in multi-earner households may be more equal compared to two-earner households. Thirdly, compared with 1980, ratios of the second earner's income to the first earner's in 2006 always increased. That reveals a

rising contribution of the second earner's income to the household economy, compared with the contribution of the first earner's.

**Table 5.** Contribution of the second earner's income to household economy in Taiwan, 1980 and 2006, by the first earner's income quintile.

		Ratio of the second earner's income to that of the first earner		Ratio of the second earner's income to household income	
(A)					
Two-earner households	Quintile households	1980	2006	1980	2006
	1(bottom)	0.63	0.93	0.33	0.33
	2	0.53	0.66	0.31	0.34
	3	0.51	0.61	0.30	0.33
	4	0.50	0.59	0.29	0.32
	5(top)	0.44	0.52	0.27	0.29
(B)					
Multi-earner households	Quintile households	1980	2006	1980	2006
	1(bottom)	0.86	1.11	0.29	0.25
	2	0.73	0.78	0.28	0.26
	3	0.68	0.74	0.27	0.26
	4	0.64	0.70	0.27	0.26
	5(top)	0.55	0.56	0.25	0.24

Sources of data: own calculations.

The picture of income inequality of the first earners and that of the second earners among two-earner households and multi-earner households in 1980 and 2006 are depicted in Table 6. Average income of the first and the second earners by top and bottom quintile households are calculated to get top to bottom quintile ratios. The top-bottom ratios of the first earner's income in two-earner households rose apparently from 3.87 in 1980 to 4.71 in 2006, with growth rate of 21.7 per cent; while the growth rate of 8.12 per cent in multi-earner households was more moderate. As for the income inequality of the second earner's, there appeared a slight growth of top-bottom ratio of 7 per cent in two-earner households in 1980, and negative growth of -3.47 per cent in 2006. Two major points can be found from Table 6. First, the first earner's income might be the major source of household income inequality among

two- and multi-earner households; while the income of the second earner's may have equalizing effect on household income inequality. Secondly, the income distributions of the first and second earners in multi-earner households were more equal than those in two-earner households.

**Table 6.** Income inequality of the first and the second earners in two-earner and multi-earner households in Taiwan, 1980 and 2006.

		unit: NT dollars		
		1980	2006	
(A) Two-earner Household	First earner's income	bottom quintile	72,309	283,157
		top quintile	280,050	1,334,173
		quintile ratio	3.87	4.71 (21.7%) <sup>a</sup>
	Second earner's income	bottom quintile	44,307	229,575
		top quintile	120,112	666,530
		quintile ratio	2.71	2.90 (7%)
(B) Multi-earner household	First earner's income	bottom quintile	67,561	300,712
		top quintile	241,815	1,161,984
		quintile ratio	3.58	3.86 (8.12%)
	Second earner's income	bottom quintile	55,686	279,023
		top quintile	128,096	620,204
		quintile ratio	2.30	2.22 (-3.47%)

Sources of data: own calculations.

a: The percentages in the parentheses are the growth rates of top-bottom quintile ratio.

### The impact of different income sources on household income inequality

As mentioned in section 2, the Gini decomposition by income source can be calculated as  $G_h = \sum_{k=1}^k S_k G_k R_k$ , and the share of inequality due to particular income source is expressed as  $I_k = \frac{S_k G_k R_k}{G_h}$ , the sum of  $I_k$  s is 1.

The influence of each component of total income inequality has been discussed by Lerman and Yitzhaki(1985) and López-Feldman(2006). If certain income source has a larger share of total income, it will have a larger impact on income inequality. If certain income is equally distributed, then it has no impact on inequality. In contrast, if certain income distributes unequally and represents a large proportion of total income, it will increase or decrease inequality depending on the value of Gini

correlation( $R_k$ ). The Gini correlation ranges between -1 and 1. As López-Feldman(2006) noted, if certain income source is unequally distributed and flows disproportionately toward those at the top of the income distribution, its contribution to overall income inequality will be positive. On the contrary, certain income source may help equalize income distribution if it is distributed unequally but favors poor households.

We divide total household income in Taiwan into three parts: the first earner's income, the second earner's income, and other household income which includes property income, transferred income and other earners' income. The results of Gini decomposition are shown in Table 7. The shares of inequality due to the first earner's income, the second earner's income and other household income were about 40:30:30 during 1980-2006 (please refers to the last column). The income share and Gini coefficient of different factor income has changed in this period. The proportion of the first earner's income, the second earner's income and other household income were 53, 29 and 17 per cent, respectively, in 1980; however, these ratios became 47, 29 and 23 per cent, respectively, in 2006. That shows that the relative contributions of three components were getting closer in this period. There seems no obvious rising share of second earner's income to total household income. The share of other household income to total household income remains about 17 per cent during 1980 to 1992, then jump to 20 per cent in 1993<sup>3</sup>.

By comparing the Gini coefficients of the first earner's income, the first plus the second earner's income, and total household income (please refer to Figure 2)<sup>4</sup>, we can conclude that the first earner's income widened the household income inequality, while the second earner's income had equalizing effects on household income distribution among households with at least two earners during 1980-2006. Furthermore, other household income also lowered household income inequality since mid-1990s.

Gini coefficient of the first earner's income ranged from 0.255 to 0.275 during 1980 to 1999; then, there was a sharp increasing income inequality of the first earner's income from 0.277 in 2000 to 0.298 in 2006. However, Gini coefficient of the first plus the second earner's income, decreased during this period. These results reveal that the second earner's income equalized income distribution. Finally, if we measured total household income inequality, Gini index has risen from 1980 to 1994 but decreased after 1996. One explanation for this is that increasing government

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<sup>3</sup>According to our detailed analysis, the share of transferred income to other household income was 44 per cent in 1992, while this ratio increases to 53 per cent in 1993 and up to 68 per cent in 2006. The increase of government social welfare expenditure in the 1990s was the reason why the ratio of transferred income increased.

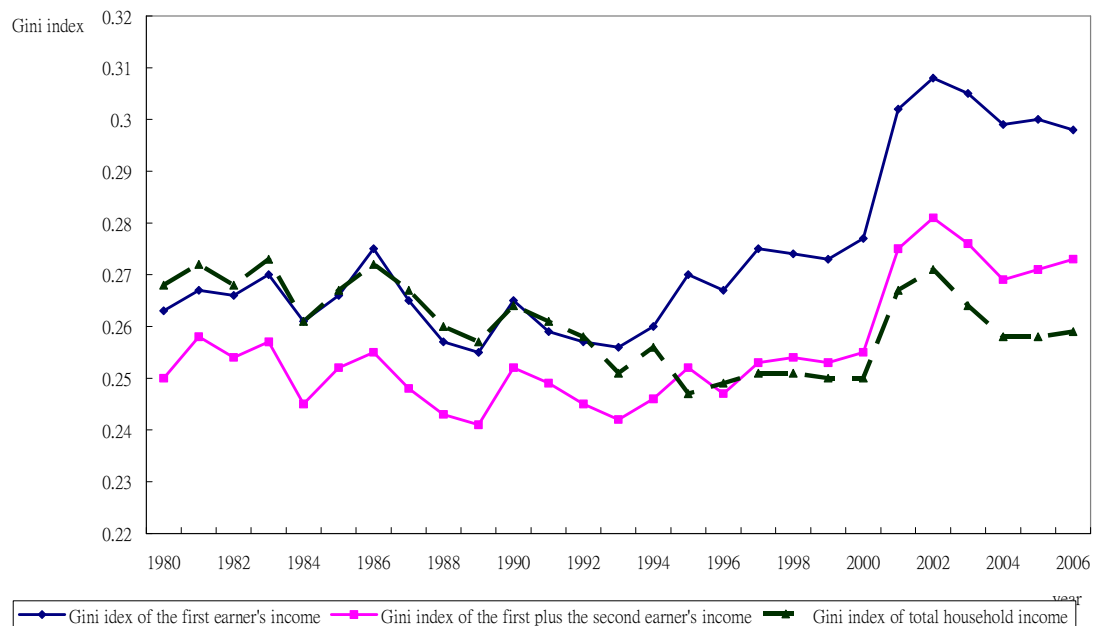
<sup>4</sup>The annual income inequality of the first earner's income, the first plus the second earner's income, and total household income were presented in Appendix Table 2.

transferred income from mid-1990s has reduced household income inequality.

**Table 7.** Gini decomposition of different income sources among households with two or more earners in Taiwan, 1980, 1993 and 2006.

	Income source	Proportion	Gini coefficient	Gini correlation	Contribution to overall inequality
1980	The first earner's income	0.538	0.263	0.811	0.428
	The second earner's income	0.290	0.314	0.815	0.277
	Other household income	0.171	0.647	0.708	0.293
	Total household income	1.000	0.268	—	1.000
1993	The first earner's income	0.506	0.256	0.803	0.415
	The second earner's income	0.291	0.297	0.816	0.280
	Other household income	0.202	0.531	0.710	0.304
	Total household income	1.000	0.251	—	1.000
2006	The first earner's income	0.477	0.298	0.836	0.458
	The second earner's income	0.291	0.299	0.827	0.278
	Other household income	0.231	0.458	0.643	0.262
	Total household income	1.000	0.259	—	1.000

Source: Own calculations.



**Figure 2.** Gini index of different income sources among two or more earners households in Taiwan during 1980-2006.

## Conclusions

As Daly & Valletta (2006) illustrated, the growing dispersion of men's earnings and changing family structure may account for most of the rise in family income inequality. Besides, more papers have studied the impact of working wives' earnings on household income inequality. Therefore, this study links the change of household structure to analyze the second-earner's financial contribution to household income and its impact on the distribution of total household income in Taiwan during 1980-2006. Major findings of this study can be summarized as following:

- (1) During the period of 1980-2006, single elderly households are becoming more equally poor, while multi-earner households were getting more equally rich. Moreover, two-earner households have become a dominant contributory factor to overall household income inequality in Taiwan.
- (2) There was a rising contribution of the second earner's income to household economy, relative to the contribution of the first earner's income. And the ratio of the second earner's to the first earner's income in multi-earner households has

been always higher than that of two-earner households, that the income gap between the first and the second earners in multi-earner households was smaller than those in two-earner households.

- (3) The income distribution of the first and second earners in multi-earner households was more equal than that in two-earner households.
- (4) The first earner's income has widened household income inequality, while the second earner's income had equalizing effect on household income distribution among households with at least two earners during 1980-2006. Furthermore, other household income lowered household income inequality since mid-1990s because of increasing share of transferred income.



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Appendix table 1. Theil decomposition of household groups in Taiwan from 1980 to 2006.

	Non-elderly Single households		Elderly single households		Single- incomer households		Two- incomer households		Multi- incomer households		Theil index		
	Income share	Theil index	Income share	Theil index	Income share	Theil index	Income share	Theil index	Income share	Theil index	Within- group Theil	Between- group Theil	Overall Theil index
1980	0.016	0.145	0.002	0.287	0.407	0.124	0.344	0.120	0.231	0.103	0.118	0.024	0.143
1981	0.014	0.148	0.002	0.229	0.402	0.118	0.351	0.116	0.230	0.116	0.117	0.026	0.143
1982	0.019	0.177	0.003	0.565	0.394	0.127	0.356	0.117	0.227	0.105	0.121	0.027	0.147
1983	0.015	0.161	0.002	0.218	0.385	0.138	0.367	0.118	0.230	0.115	0.126	0.028	0.154
1984	0.016	0.195	0.003	0.184	0.392	0.140	0.368	0.108	0.222	0.099	0.120	0.031	0.151
1985	0.016	0.172	0.004	0.158	0.390	0.133	0.370	0.118	0.220	0.097	0.120	0.035	0.155
1986	0.017	0.207	0.004	0.226	0.361	0.138	0.377	0.140	0.240	0.105	0.132	0.036	0.168
1987	0.017	0.192	0.005	0.224	0.373	0.139	0.377	0.119	0.228	0.100	0.124	0.041	0.164
1988	0.020	0.229	0.005	0.205	0.375	0.153	0.385	0.115	0.215	0.095	0.128	0.040	0.167
1989	0.018	0.231	0.006	0.217	0.375	0.140	0.385	0.118	0.216	0.081	0.121	0.040	0.161
1990	0.020	0.213	0.006	0.201	0.357	0.141	0.383	0.119	0.233	0.095	0.123	0.048	0.171
1991	0.021	0.618	0.007	0.288	0.350	0.134	0.405	0.119	0.216	0.094	0.131	0.041	0.172
1992	0.020	0.306	0.007	0.218	0.350	0.145	0.406	0.110	0.218	0.085	0.121	0.048	0.169
1993	0.017	0.189	0.007	0.193	0.334	0.158	0.414	0.106	0.227	0.077	0.119	0.052	0.170
1994	0.017	0.134	0.002	0.292	0.309	0.141	0.439	0.116	0.233	0.089	0.118	0.036	0.153
1995	0.020	0.194	0.009	0.180	0.332	0.142	0.418	0.110	0.221	0.073	0.115	0.055	0.170
1996	0.023	0.215	0.008	0.141	0.323	0.143	0.416	0.106	0.231	0.081	0.115	0.056	0.171
1997	0.025	0.208	0.010	0.119	0.318	0.144	0.417	0.103	0.229	0.087	0.115	0.059	0.174
1998	0.027	0.205	0.011	0.136	0.322	0.158	0.423	0.113	0.217	0.082	0.123	0.060	0.183
1999	0.031	0.184	0.012	0.139	0.325	0.155	0.411	0.103	0.221	0.089	0.120	0.064	0.183
2000	0.033	0.186	0.012	0.164	0.319	0.140	0.423	0.109	0.212	0.078	0.116	0.066	0.182
2001	0.033	0.265	0.011	0.157	0.320	0.199	0.439	0.126	0.197	0.102	0.149	0.068	0.217
2002	0.025	0.275	0.009	0.163	0.325	0.177	0.435	0.138	0.206	0.091	0.145	0.065	0.210
2003	0.029	0.210	0.010	0.212	0.322	0.176	0.429	0.117	0.210	0.108	0.138	0.069	0.206
2004	0.032	0.220	0.010	0.173	0.319	0.168	0.439	0.134	0.200	0.083	0.138	0.067	0.205
2005	0.029	0.225	0.011	0.166	0.323	0.173	0.431	0.117	0.206	0.087	0.132	0.071	0.203
2006	0.030	0.181	0.012	0.163	0.314	0.177	0.435	0.118	0.209	0.082	0.132	0.068	0.199

Source: Own calculations.

Appendix Table 2. Gini index of the first earner's income, the first plus the second earner's income, and total household income.

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Gini index of the first earner's income	0.263	0.267	0.266	0.27	0.261	0.266	0.275	0.265	0.257	0.255	0.265	0.259	0.257	0.256	0.26	0.27	0.267	0.275
Gini index of the first plus the second earner's income	0.25	0.258	0.254	0.257	0.245	0.252	0.255	0.248	0.243	0.241	0.252	0.249	0.245	0.242	0.246	0.252	0.247	0.253
Gini index of the total household income	0.268	0.272	0.268	0.273	0.261	0.267	0.272	0.267	0.26	0.257	0.264	0.261	0.258	0.251	0.256	0.247	0.249	0.251

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Gini index of the first earner's income	0.274	0.273	0.277	0.302	0.308	0.305	0.299	0.3	0.298
Gini index of the first plus the second earner's income	0.254	0.253	0.255	0.275	0.281	0.276	0.269	0.271	0.273
Gini index of the total household income	0.251	0.25	0.25	0.267	0.271	0.264	0.258	0.258	0.259

Source: Own calculations.