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## Working Hours in Supply Chain Chinese and Thai Factories: Evidence From the Fair Labor Association's 'Soccer Project'

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### ABSTRACT

This paper examines the determinants of working excessive hours, defined as working in excess of 60 hours per week or for more than six consecutive days, in Chinese and Thai supply-chain factories. We use a matched employer-employee dataset collected from 15 Chinese and Thai footwear and sporting apparel supply-chain factories, which supply international brands. Matched employer-employee data allows us to examine the effect of worker and firm characteristics on hours worked. We find that in addition to the demographic and human capital characteristics of workers, firm-level characteristics and worker awareness of how to refuse overtime are important factors in explaining variation in hours worked.

Keywords: China, hours worked, supply chain factories.

JEL codes: J22, J24, O15,

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## **Introduction**

Hours worked has been shown to be correlated with job satisfaction, work-life balance including family relationships and social interaction as well as mental health, industrial injuries and productivity in the workplace among other factors (see eg. Bacon *et al.*, 2005; Clark, 2005; Fritjers *et al.*, 2009; Saffer & Lamiraud, 2008; Wilkins, 2005). Hours worked is also considered an important aspect when evaluating the quality of a job (Clark, 2005). Several studies have documented the adverse effects on social capital and well-being of working very long hours (see eg. Park *et al.*, 2001; Shields, 1999; Sparks *et al.*, 1997).

There are relatively few studies on the determinants of hours worked in the academic literature. There are a few studies in the economic history literature which have examined the determinants of changes in hours worked in the nineteenth and early twentieth centuries or differences in hours worked between the ‘old world’ (Europe) and the ‘new world’ (Australasia and North America) (Atak *et al.*, 2003, Costa, 2000; Domenech, 2007; Huberman & Mins, 2007). Some studies have examined determinants of differences in hours worked across OECD countries (Bell & Freeman, 2001; Clark, 2005) or regional differences in hours worked within specific OECD countries (see eg. Heisz & LaRochelle-Cote, 2007). Bryan (2007) and Paull (2008) examine different aspects of the determinants of hours worked in the United Kingdom. Presser (1995) examined the determinants of non-standard working hours (evenings, overtime, shift work) in the United States, while Reynolds (2003) studied the mismatch between actual and preferred hours of work in the United States. There are, however, no studies of the determinants of hours worked in developing countries.

The purpose of this paper is to examine the determinants of hours worked in supply chain factories in China and Thailand, using a unique dataset collected by the Fair Labor Association (FLA). In particular, the paper focuses on the determinants of working excessive hours, defined as in excess of 60 hours per week and for more than six consecutive days. In addition to being the first study to examine the determinants of hours worked in developing countries, the paper makes a methodological contribution to the literature on hours worked. With the exception of Bryan (2007), previous studies have ignored the employer dimension to hours worked. The traditional approach to examining hours worked has been premised on the standard economic model of labor supply, in which hours worked, conditional on the wage, depend only on workers' 'tastes' for work (Bryan, 2007). There is, however, growing evidence that firm policies on hours worked matter. In this paper we use a matched employer-employee dataset that allows us to examine the effect of both worker characteristics and firm characteristics on hours worked. While Bryan (2007) also employs a matched employer-employee dataset for the United Kingdom, our dataset has the advantage that in addition to data on firm characteristics, we also have data on firm policies on hours worked.

Foreshadowing the main results, we find evidence of excessive overtime in violation of the FLA Code of Conduct. We find significant country differences in the form excessive overtime takes. In China excessive overtime is more likely to take the form of working more than six consecutive days, while in Thailand, it is more likely to take the form of working in excess of 60 hours per week. We find that in addition to the demographic and human capital characteristics of workers, firm-level characteristics are important in explaining variation in hours worked. We find that while a firm having a policy on hours worked is not important,

worker awareness of how to refuse overtime is negatively correlated with both frequency of working in excess of 60 hours per week and working more than six consecutive days.

### **Context of the Study**

Labor standards in supply chain factories producing for major apparel and sportswear brands has long been an important issue (Esbenshade, 2004; Locke *et al.*, 2007; Locke & Romis, 2007; Nadvi, 2008). Until the 1990s the multinational apparel companies adopted the view that labor standards in their contracting factories were outside their purview. This started to change in the early 1990s, when the multinational companies began to develop their own codes of conduct for suppliers, as well as a variety of monitoring mechanisms aimed at enforcing compliance with these codes (Esbenshade, 2004). Following the development of codes of conduct, monitoring agencies, such as the FLA and Worldwide Responsible Apparel Production (WRAP) program, have emerged to monitor labor standards in supply chain factories (Esbenshade, 2004; O'Rourke, 2003). A large literature exists on the effectiveness of these agencies. For a review of the relevant literature see Locke *et al.* (2007).

The FLA, which was one of the first monitoring agencies to be established, was convened originally by the Clinton administration in 1996 as the Apparel Industry Partnership. It evolved out of a multi-stakeholder partnership designed to end the use of child labor and other sweatshop practices in apparel and footwear factories. FLA affiliated companies include participating companies, participating suppliers and collegiate licensees that produce products for colleges and universities affiliated with the FLA. In 2008 28 leading brands were participating companies; there were 11 participating suppliers and a host of collegiate

licensees. Three quarters of member factories in the FLA program are in the apparel sector, followed by footwear, equipment and accessories. China has the largest number of workers under the auspices of the FLA program, while Thailand has the fourth largest number of workers in the FLA program, following China, Vietnam and Indonesia. In 2008, 1.7 million workers were employed in factories in China supplying FLA stakeholders, while in Thailand the corresponding number was 248,000 (FLA, 2009a). The FLA promotes and enforces a broad Workplace Code of Conduct, based on International Labor Organization (ILO) standards. Companies that join the FLA commit to establishing internal systems for monitoring workplace conditions and maintaining Code standards throughout their supply-chains. A core component of the FLA's program is conducting independent and unannounced audits of FLA affiliates and evaluating compliance with Code elements. In 2007-2008 FLA accredited monitors conducted 239 factory visits in 27 countries (FLA, 2009a).

The dataset used in this paper was collected as part of the FLA's 'soccer project'. In the lead-up to the Football World Cup in 2006 in Germany, there was widespread criticism of factory conditions in the supply chain for football products (apparel, footballs and shoes) in countries such as China, Pakistan and Thailand. In Pakistan complaints centred on the use of child labor in producing footballs (Nadvi, 2008). In China and Thailand, complaints focused on grievance procedures and hours worked in supply chain factories. The FLA's 'soccer project' examines these issues in factories producing a range of products – balls, boots and clothing accessories - for major brand companies affiliated with the FLA (FLA, 2009a). Specifically, as part of the 'soccer project', the FLA administered questionnaires to both factory managers and workers in 15 firms in China and Thailand that are footwear and sporting apparel supply-

chain factories, supplying international brands (FLA, 2009b). This paper uses data from the 'hours of work' segment of these questionnaires to examine determinants of hours worked in export-oriented supply-chain factories in China and Thailand. As such, it is the first study to systematically examine the determinants of hours worked in developing countries.

The controversy over hours worked in football supply chain factories occurs against the backdrop of more general concern about hours worked in China and Thailand. According to the ILO (2006), in Thailand 46.7 percent of people work in excess of 48 hours per week, which is the third highest in the world. Previous studies have documented the poor working conditions of migrant Thai workers (Pangsapa, 2007) and poor occupational health and safety conditions of Thai factory workers (Poosanthanasarn & Lochachit, 2005). Poapongsakorn (1987) documented long-working hours in export-oriented firms in the garment industry in Thailand. Poapongsakorn (1987) found that 43 per cent of workers in Thai export firms worked at least 72 hours per week, while the corresponding figure for non-exporting firms was 20 per cent. Many of the workers in Thai export-oriented firms are female. In the sample in the present study 78 percent of employees in the Thai factories were female. That females work long hours in such firms has been shown to generate adverse social outcomes among other things. For example, previous research for Thailand has shown that female employment and long working hours have been linked with marital instability (Edwards *et al.*, 1992)

In China, concern about excess hours has focused on migrant workers who make up 94 per cent of the workforce in the factories sampled in China in the present study. Rural-urban migrant workers number 130 million and are the engine room that are driving China's high

rate of growth. Chinese workers, particularly migrant workers, work long hours. One study of migrant workers' working hours found that nearly twice as many migrants as urban residents worked six days a week, and almost 60 per cent of migrants worked seven days a week (ILO, 2007). Another study of the working hours of rural-urban migrants in Shanghai found that the mean hours worked was 55.5 with 40 per cent working 40 to 60 hours per week; 25 per cent working 70 hours per week and 7 per cent working more than 70 hours per week (Feng *et al.*, 2002). Long working hours have adverse implications for China's migrant workers. Fritjers *et al.* (2009) found that long working hours have an adverse effect on the mental health of China's rural-urban migrant workers. Verite (2004) found long working hours in supply chain factories were linked to fatigue, depression and sadness. Long-working hours have also been shown to be positively correlated with workplace accidents and occupational diseases among rural-urban migrant workers in China (Jackson *et al.*, 2007; Nyland *et al.*, 2005).

Long-working hours leave little time for leisure. Qualitative studies undertaken by Jacka (2005) and Li (2006) reported that rural-urban migrants in China allocate little time to leisure activities. Li (2006) interviewed 26 rural-urban migrants in Tianjin about their leisure activities. Twenty interviewees in Li's sample indicated that they never went out after work because they were exhausted and wanted to rest or did not want to spend money on socializing. Nielsen and Smyth (2007) found that when rural-urban migrants did engage in leisure activities, it involved going to a park or a library that attracted no charge.

## **Data**

FLA service providers collected the data in the 15 factories participating in the soccer project between April and May 2008. Data were collected from eight factories in Thailand and seven

factories in China. Two FLA-designed questionnaires were administered. Sustainable Compliance Assessment Tool (SCAT) is an on-line questionnaire for factory managers designed to assess factory performance on sustainable compliance issues. Sustainable Compliance Perceptions (SCOPE) is a questionnaire administered to workers by local FLA service providers during working hours. The number of workers selected to participate in the SCOPE survey from each factory was decided on the basis of the size of each factory using a sample size calculator. The sample size varied from about 80 workers in small factories to 200 workers in large factories. Within each factory, workers were randomly selected to complete the SCOPE survey and, depending on the factory's workforce characteristics, stratification was applied whenever necessary. Results from the SCAT and SCOPE surveys can be directly compared, providing matched employer-employee data.

As shown in Table 1, 2083 SCOPE questionnaires were administered to workers; of which, 652 were administered to workers in Chinese firms and 1431 were administered to workers in Thai firms. The average number of workers surveyed per firm across the sample was 139, with the corresponding figures in China and Thailand being 93 and 179 respectively. For the sample as a whole, there are 930 valid responses to all questions employed in the analysis in this paper, representing 44.7 per cent of the total. In China there were 351 valid responses (53.8 per cent of the total) and in Thailand this number was 579 (40.5 per cent of the total).

The questions in the SCOPE survey related to working time focused on working excessive hours. The FLA Workplace Code of Conduct reads, in part: 'Except in extraordinary business circumstances, employees shall (i) not be required to work more than the lesser of (a) 48 hours per week and 12 hours overtime or (b) the limits on regular and overtime hours allowed



by the law of the country of manufacture ....and (ii) be entitled to at least one day off in every seven day period' (FLA, 2009a, p. 37). The FLA Code of Conduct, on this point, reflects ILO guidelines on appropriate hours worked (see eg. ILO, 2006). The SCOPE survey was designed to identify the proportion of workers who were working excessively long hours in breach of FLA (and ILO) guidelines. Specifically, the working time questions in the SCOPE survey asked workers: How often did you work more than 60 hours per week in the last three months? How many hours did you work when you worked more than 60 hours per week in the last three months? How often did you work more than six consecutive days in the last three months? What is the highest number of continuous days worked? Workers were required to provide answers to these questions in categories as shown in Table 2.

Table 2 shows that, in terms of frequency, just under one half of workers sampled had worked more than 60 hours per week in the previous three months. In China approximately 36 per cent of workers sampled had worked in excess of 60 hours per week in the previous three months, while in Thailand the corresponding figure was approximately 53 per cent. The finding that a disproportionate number of respondents work excessive hours is consistent with previous results for China (Feng *et al.*, 2002; ILO, 2007; Meng & Bain, 2007; Meng & Zhang, 2001) and Thailand (ILO, 2006; Poapongsakorn, 1987). At the high end, about 10 per cent of respondents stated that they worked in excess of 60 hours per week in the previous three months 'often' or 'always'. Of those who did work in excess of 60 hours per week in the last three months, around three-quarters worked between 61 and 66 hours per week, although, at the high end, there are in excess of 10 per cent of those working more than 60 hours per week who work more than 70 hours per week in both countries.

About 15 per cent of respondents in Thailand and one third of respondents in China stated that they had worked in excess of six consecutive days in the previous three months. Around 12 per cent of respondents in China stated that they had ‘often’ or ‘always’ worked in excess of six days in the previous three months, while in Thailand the corresponding figure was about three per cent. Of those who stated that they had worked in excess of six consecutive days in the previous three months, about three quarters stated that the highest number of consecutive days worked was seven. There was, however, a significant difference between countries. Of those who stated that they had worked in excess of six consecutive days in the previous three months, in China 81 per cent stated that the highest number of consecutive days worked was seven, while in Thailand the number was 67 per cent. At the same time, in excess of 10 per cent of respondents who worked more than six consecutive days in Thailand worked at least 13 consecutive days, while in China the corresponding figure was 5 per cent.

The results presented in Table 2 point to two conclusions. First, compared with Thai factories, in Chinese factories excessive overtime was more likely to occur in the form of longer working periods without a rest day than excessive daily overtime. To some extent, this difference may be explained by different regulations governing work hours across the two countries. Generally speaking, Thai labor law is more liberal than Chinese labor law. While both countries require one rest day per week and set the maximum regular working hours at 8 hours per day, the overtime regulations differ significantly. Chinese labor law states that overtime should be no longer than three hours per day and should not be more than 36 hours per month. Thai labor law does not define daily overtime limits and sets the weekly limit for

overtime at 36 hours per week, thus allowing for extremely long working days (FLA, 2009b). Second, as mentioned above, each of the factories surveyed supply football products to internationally recognised brand names and, as such, have agreed to follow the standards specified in the FLA Code of Conduct. The results suggest that for the sample as a whole, 48 per cent of workers reported working hours that exceeded the 60 hour per week FLA code limit and 25 per cent of workers were working consecutive days in excess of the FLA code requirement to have to have at least one day off in every seven-day period. This finding is consistent with the conclusion of Verite (2004) who surveyed workers in 40 export-oriented supply-chain factories in China, predominantly in the garment, knitting and footwear sectors. Verite (2004, p.8) concluded that ‘both legal limits and the guidelines outlined in corporate codes of conduct are routinely violated in Chinese supplier factories’.

Table 3 presents descriptive statistics for the sample in four categories: labor supply characteristics of workers; human capital characteristics of workers; characteristics of the firm and firm policies on hours of work. Of the workers who provided valid responses, 73.4 per cent were female, 59.8 per cent were married, 8.9 per cent lived in a factory dormitory and the average length of time working in the factory was 42.3 months. In terms of human capital, 26.8 per cent had completed primary school or less, 42.8 per cent had completed middle school, 27.7 per cent had completed high school and 2.7 per cent had completed university. The average age of respondents was 30 years old. In response to the question: Do you agree that you do not have the skills/training to do your job? almost half agreed or ‘more or less’ agreed . In the factories that participated in the soccer project, the average number of employees was 2106 and over 70 per cent of employees were female. About 54 per cent of

employees were rural-urban migrants, although there is a sizeable difference here between China and Thailand. In China 93.7 per cent of employees in the participating factories were rural-urban migrants, while in Thailand this figure was 6.7 per cent. We also include variables for factory-related risks, worker-related risks and client-factory risks that all potentially impact on work schedules and hours worked in the factory. Finally, we include a series of variables related to the firm's policies on hours of work. These variables cover whether the firm has a policy on hours of work, worker's awareness of such a policy and whether the worker was aware of the right to refuse overtime and do so without reprisal.

### **Empirical Specification and Econometric Methodology**

We employ a specification where we express hours worked ( $HW$ ) as a function of: (i) labor supply characteristics of workers ( $LS$ ), (ii) human capital characteristics of workers ( $HC$ ); (iii) firm characteristics ( $FC$ ) and (iv) firm policies on hours of work ( $FP$ ). This relationship can be expressed as follows where  $\varepsilon$  is the error term, reflecting unobserved random factors.

$$HW=f(LS, HC, FC, FP, \varepsilon) \tag{1}$$

To measure hours worked we use respondents' answers to two questions in alternative specifications: How often did you work more than 60 hours per week in the last three months? How often did you work more than six consecutive days in the last three months? Respondents answered on a scale of 1 to 5 where 1 denotes 'never' and 5 denotes 'always' (see Table 2). Note that in the SCOPE survey, respondents were not asked to give the exact number of hours worked on average per week. Hence, the dependent variable is categorical rather than continuous. Following Bryan (2007) we do not include wages on the right-hand side of Equation (1) for two reasons. First, the SCOPE survey did not contain a question on

wages. Second, as Bryan (2007) notes, wages are endogenous and are adequately captured by the human capital characteristics of the workers. Bryan (2007) found that when wages were added to an equation similar to Equation (1), wages added little to explaining the variance in hours worked and that the coefficients on the other variables were the same.

Beginning with the labor supply characteristics of workers, we expect that females will be less likely to work excessive hours because of traditional familial responsibilities. This is consistent with findings for a large literature for developed countries (see references cited in Paull, 2008). Similarly, we expect that workers who are married will be more likely to want to synchronize their 'home time' with their partner and, hence, have less flexibility to work excessive hours. This is consistent with findings in Bryan (2007) and Presser (1991). The effect of number of children on work hours is ambiguous. On the one hand, the expense of having children creates incentives to enhance family income by increasing the number of hours worked. On the other hand, the need to care for children and the additional domestic responsibilities, together with the desire of the parents to spend sizeable amounts of time at home with their children, increase the opportunity cost of working long hours. We also interact marital status with gender and gender with number of children. We expect that wives will be less likely to work excessive hours than husbands and that mothers with more children will be less likely to work long hours than fathers with more children. These expectations are based on traditional gender roles that are persistent in China and Thailand. Even in developed countries, such as the United Kingdom and United States, where traditional gender roles are changing, extant studies have found that wives are less likely to work long hours than husbands and that number of children is more likely to reduce hours work for mothers than

fathers (see eg. Joshi *et al.*, 1996, 1999; Paull, 2006, 2008). We expect that workers who live in factory dormitories will be more likely to work excessive hours because their living arrangements mean they are more likely to be 'on-site' if extra hours are required. Moreover, living in a factory dormitory might imply less connection to the local community and, hence, less interests outside work. In the sample, a higher proportion of workers in China, where most employees are rural-urban migrants, live in factory dormitories. Previous research suggests that rural-urban migrants in China are less likely to engage in leisure activities than those with an urban household registration (Nielsen & Smyth, 2007).

Turning to the human capital characteristics of workers, we expect that workers with higher human capital will have higher productivity and, hence, be less likely to work longer hours, all things being equal. Workers with higher human capital will be less likely to work excessive hours because they will be more able to complete required tasks within normal working hours. Hence, we expect the better educated and those who feel more confident that they have the skills and training to do the job to be less likely to work excessive hours. Age is a proxy for on-the job experience. We expect the hours worked-experience profile to follow a U shape in experience. Hours worked will initially decrease as human capital accumulates, reach their minimum when human capital, and hence productivity, is at a maximum and eventually increase as human capital depreciation dominates accumulation.

Note that with respect to human capital characteristics the expectations differ from what existing studies suggest is the case in the United Kingdom and United States. Individuals in these countries with a college education work longer hours than their counterparts with less

formal education (Bryan, 2007; Robinson & Godbey, 1997). However, this result reflects the fact that in these countries white collar workers, who are typically better-educated, work longer hours than lower-paid blue collar workers. In these countries the main beneficiaries of the decline in the length of the work day and work week over the second half of the twentieth century were blue-collar workers in low-paid jobs (Coleman & Pencavel, 1993a, 1993b; Costa, 2000). This has not been the case for blue-collar workers in developing countries where hours worked remain high and our sample consists of low-paid blue collar workers.

Among the firm characteristics, we expect that in firms which employ a higher proportion of females, excessive working hours will be less expected, while in firms which employ a higher proportion of rural-urban migrants, excessive working hours will be more expected. Both will represent 'firm norms', which will ultimately influence whether the respondent works excessive hours (Bryan, 2007) We expect that in firms which have higher client-factory risks, higher factory-related risks and higher worker risks, workers will be more likely to work excessive hours. We expect that workers who are aware that they can refuse overtime, workers who can refuse overtime without fear of reprisal and workers who have received training on the firm's policies on hours worked will be less likely to work excessive hours. Similarly, we expect that in firms in which both the firm and worker confirmed that the firm had a policy on hours of work, workers will be less likely to work excessive hours.

We estimate Equation (1) using both ordered probit and ordinary least squares (OLS). In a methodological paper, Ferrer-i-Carbonnel and Fritjers (2004) examine whether it makes any difference to the results if ordered probit or OLS is employed in the context of happiness

studies. Their conclusion was that the results are not sensitive to the choice of OLS or latent variable methods. We find that the results of the OLS and ordered probit estimates are generally quantitatively similar. Hence, because the OLS results are easier to interpret, we generally focus on the OLS estimates. To address bias stemming from the use of aggregated firm variables in an individual wage equation, standard errors were clustered at the firm level in both the OLS and ordered probit models (see Moulton, 1990).

## **Results**

The results for Equation (1) where the dependent variable is ‘how often do you work more than 60 hours per week?’ are provided in Table 4. The results for the ordered probit and OLS model in terms of sign and significance are generally the same. The exceptions are the dummy variable for being married as well as the index depicting the scale of risks related to the client-factory relationship. The coefficient on the dummy variable for being married is negative and statistically significant in the ordered probit model, consistent with expectations, but statistically insignificant in the OLS model. The coefficient on the variable depicting risks related to the client-factory relationship is unexpectedly positive in the ordered probit model. This result suggests that lower risk reduces the likelihood of working in excess of 60 hours per week. This variable, though, is statistically insignificant in the OLS model.

Of the other variables that are statistically significant in both the OLS and ordered probit models, we find that living in a factory dormitory has a positive and significant effect on working in excess of 60 hours per week. The results for the OLS model suggest that on a one to five scale, where one is that the respondent ‘never’ and five is that the respondent ‘always’ works in excess of 60 hours per week, living in a factory dormitory contributes to respondents



reporting a higher category by 0.19 points *ceteris paribus*. We find that individuals who feel least sufficiently skilled or trained to do their job are statistically more likely to work in excess of 60 hours per week, relative to those who feel they are sufficiently skilled or trained. The results for the OLS model suggest that in response to the question: Do you agree that you do not have the skills/training to do your job? answering 'yes, absolutely', relative to those who answered 'not at all', contributed to respondents reporting themselves as working in excess of 60 hours per week more often by 0.3 points *ceteris paribus*.

The size of the firm, measured in terms of number of employees and the annual turnover rate, has a positive and significant effect on working in excess of 60 hours, but the effects are small. For example, the results for the OLS model suggest that each additional 100 workers in the firm will contribute to respondents reporting a higher prevalence of working in excess of 60 hours per week by 0.007 points *ceteris paribus*. In firms with a higher proportion of migrant workers, respondents are more likely to work in excess of 60 hours per week. The results for the OLS model suggest that each additional 10 per cent of migrants in the firm will contribute to respondents reporting a higher prevalence of working in excess of 60 hours per week by 0.18 points *ceteris paribus*. The coefficients on the scales for factory-related risks and worker-related risks are negative and significant as expected, suggesting that respondents are more likely to work in excess of 60 hours per week in firms which face higher risks along these dimensions. These results make sense. If machines break down or there are problems with the production line or the firm receives excessive production orders, workers will need to put in longer hours to meet production schedules. Similarly if workers are absent because

of illness or without giving notice or there is otherwise a shortage of workers, workers are more likely to have to work excessive hours to get orders out in time.

Of the variables capturing firm policies on hours of work, the coefficient on a dummy variable denoting that the respondent was aware of how to refuse overtime was negative and significant in both the ordered probit and OLS results. Being aware of how to refuse overtime contributed to respondents reporting a lower prevalence of working in excess of 60 hours per week by 0.25 points *ceteris paribus*. The coefficient on the dummy variable for China was negative and statistically significant, indicating that workers in China were statistically less likely to work in excess of 60 hours relative to workers in Thailand. The results for the OLS model suggest that working in a Chinese factory contributed to respondents reporting a lower prevalence of working in excess of 60 hours per week by 1.32 points *ceteris paribus*. This finding is consistent with the stricter labor laws in China, compared with Thailand, regarding the number of hours that can be worked overtime in a day and in a week.

Two variables that are significant in both the OLS and ordered probit results, but with unexpected signs are that the respondent is married and female and the proportion of females working in the firm. The coefficients on both variables are positive. Two factors might explain the result for the interaction term. First, for non-migrants, who can be expected to live with their families, extended families are the norm in China and Thailand. Hence, married females have support from the extended family at home and can work longer hours. Second, many married migrant women in China work in the city separate from their husband. Their prime objective is to earn as much as possible to send back to their hometown (Fan & Wang,

2008). These women do not have the desire or need to find time to spend with a partner and, hence, have more flexibility to work longer hours. The results for the proportion of females in the factory reflect the fact that these factories are not 'female-friendly' in terms of policies designed to promote work-life balance, which might be associated with having a large female workplace in developed countries. Instead, females are represented in disproportionate numbers because of their comparative advantage in the sort of work that is required to produce sporting apparel and footwear. The results suggest that in large factories which employ a high proportion of migrant and female workers, there is a 'norm' of excessive hours that explain long hours over and above individual worker characteristics. Based on the results of the Wald test, labor supply characteristics of workers, human capital characteristics of workers, characteristics of the firm and firm policies on hours of work each have a statistically significant effect on proclivity to work in excess of 60 hours per week.

The results for Equation (1) where the dependent variable is 'how often do you work more than six days in a row?' are provided in Table 5. The results for the OLS and ordered probit model in Table 5 diverge more than in Table 4. Being married and living in a factory dormitory has a statistically significant positive effect on the frequency of working in excess of six days in a row in the ordered probit model, but are statistically insignificant in the OLS model. The ordered probit model suggests that the hours worked-experience profile follows a U shape in experience with hours worked bottoming out at age 33, but age and age squared are statistically insignificant in the OLS model. Size of the firm appears to have little effect on consecutive days worked. Number of workers in the firm is significant with a negative sign in the ordered probit model, but is insignificant in the OLS results, while annual turnover

is insignificant in both models. A dummy variable denoting that both the worker and firm confirmed that the firm had a policy on hours of work was significant with a negative sign in the ordered probit model, but was statistically insignificant in the OLS model.

Of the variables that are statistically significant in both OLS and ordered probit models, we find that females are statistically less likely to work more than six days in a row. The results for the OLS model suggest that on a one to five scale where one is that the respondent 'never' and five is that the respondent 'always' works more than six days in a row, being female contributes to reporting a lower frequency by 0.21 points *ceteris paribus*. Workers in firms with a higher proportion of female workers were statistically more likely to report a higher prevalence of working more than six days in a row in both OLS and ordered probit models. Based on the OLS results, being in a firm with a higher proportion of female workers contributes to reporting a higher category by 0.11 points *ceteris paribus*. Interestingly, respondents in firms with a high proportion of migrant workers were statistically less likely to work more than six days in a row. Based on the OLS results, being in a firm with a higher proportion of migrant workers contributes to reporting a lower frequency of working more than six days in a row by 0.08 points *ceteris paribus*. Hence, the norm in factories with a high proportion of female employees is for workers to work both in excess of 60 hours per week and work more than six consecutive days, while in factories with a high proportion of migrant workers excessive overtime comes in the form of working 60 hours per week, while there is no norm of working a high number of consecutive days, *ceteris paribus*.

The scale of risks related to the client-factory relationship is statistically significant with an unexpected positive sign in both the OLS and ordered probit models. However, the scale of risks related to workers is statistically significant with the expected negative sign in both models. Workers who responded that they were aware of how to refuse overtime were statistically less likely to work more than six days in a row. The OLS results suggest that being aware of how to refuse overtime contributes to reporting a lower frequency of working more than six days in a row by 0.26 points *ceteris paribus*. Based on the results of the Wald test, labor supply characteristics of workers, human capital characteristics of workers, characteristics of the firm and firm policies on hours of work each have a statistically significant effect on proclivity to working more than six days in a row. The dummy variable for China is positive and significant in both models. This result confirms the conjecture earlier based on casual inspection of the data that excessive work hours in China takes the form of working more than six consecutive days, while in Thailand excessive work hours is more likely to take the form of working in excess of 60 hours per week. This result, as discussed earlier, is consistent with the tighter Chinese labor laws on the maximum number of hours that employees can work overtime in a day. Chinese factories circumvent this law by having their employees work more than six consecutive days more often than Thai firms.

## **Conclusion**

This has been the first study to systematically examine the determinants of hours worked in developing countries. It has done so using a unique dataset on blue collar workers in supply-chain factories in China and Thailand collected as part of the FLA's soccer project. The main conclusions are as follows. First, there is evidence that employees in these factories are working excessive overtime in violation of FLA and ILO guidelines. Second, the form the excessive

overtime takes varies between countries. In Thailand, employees are more likely to work in excess of 60 hours per week, while in China, employees are more likely to work in excess of six consecutive days. Third, in addition to the labor supply and human capital characteristics of the workers, there is evidence that workplace level effects are important. The composition of the workforce in the firm and the risk factors that the firm confronts in meeting production targets both have a significant effect on variation in excessive overtime. Fourth, having a firm policy on hours of work and being able to reject overtime without fear of reprisal are not as important in predicting excessive overtime as the worker simply being aware of how he or she could refuse overtime. Being aware of how to refuse overtime had a statistically significant negative effect on both working greater than 60 hours per week and working more than consecutive six days

This study provides a snapshot of the determinants of hours worked in factories participating in the FLA's soccer project. In order to get a broader perspective on hours worked in China and Thailand a more comprehensive database is needed. Examining hours worked in China or Thailand using a more comprehensive database that included a broader set of firms and both blue collar and white collar workers is one avenue for future research. One of the limitations of the current study, reflecting the manner in which the questions on hours worked in the SCOPE survey were asked, is that the dependent variable is categorical, which makes interpretation of the results less intuitive. Future research for developing countries could use a dataset where the dependent variable is continuous as used, for example, by Bryan (2007). This study focuses on excessive overtime. In this sense, this study adds directly to the literature on working irregular hours (see eg. Presser, 1995). Concentrating on why individuals work excessive hours makes sense in supply-chain factories where excessive overtime in violation of the relevant codes of

workplace conduct is relatively frequent. However, future research, for a broader set of firms and workers, could focus on hours worked in developing countries more generally.

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**Table 1: Number of Workplace and Employee Observations**

| Sample   | Number of Firms | Number of Workers Surveyed | Mean Workers Surveyed per Firm | Valid Responses |
|----------|-----------------|----------------------------|--------------------------------|-----------------|
| China    | 7               | 652                        | 93                             | 351 53.83%      |
| Thailand | 8               | 1431                       | 179                            | 579 40.46%      |
| All      | 15              | 2083                       | 139                            | 930 44.65%      |

**Table 2: Hours and Days Worked in Chinese and Thai firms**

|   | All   | China | Thailand |
|---|-------|-------|----------|
| Work >60 hpw in last 3 months (%)             |       |       |          |
| Never   | 52    | 63.71 | 46.80    |
| Rarely  | 18.21 | 16.96 | 18.76    |
| Sometimes                                     | 20.20 | 13.95 | 22.98    |
| Often   | 7.11  | 3.80  | 8.57     |
| Always  | 2.48  | 1.58  | 2.88     |
| Hours worked, when working >60hpw (%)         |       |       |          |
| 61-63 hours                                   | 55.81 | 64.93 | 53.2     |
| 64-66 hours                                   | 20.93 | 18.96 | 21.5     |
| 67-69 hours                                   | 10.78 | 5.21  | 12.38    |
| 70-72 hours                                   | 10.04 | 6.64  | 11.02    |
| >72 hours                                     | 2.43  | 4.27  | 1.90     |
| Work >6 consecutive days in last 3 months (%) |       |       |          |
| Never   | 78.48 | 64.57 | 84.69    |
| Rarely  | 8.31  | 14.17 | 5.69     |
| Sometimes                                     | 7.58  | 9.45  | 6.74     |
| Often   | 4.81  | 10.71 | 2.18     |
| Always  | 0.83  | 1.10  | 0.70     |
| Highest number of continuous days worked      |       |       |          |
| 7 days  | 74.42 | 81.17 | 67.13    |
| 8-12 days                                     | 12.90 | 10.31 | 15.64    |
| 13-18 days                                    | 4.84  | 3.59  | 6.16     |
| 19-24 days                                    | 3.00  | 1.35  | 4.74     |

|          |      |      |      |
|----------|------|------|------|
| >24 days | 4.84 | 3.59 | 6.16 |
|----------|------|------|------|

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**Table 3: Descriptive Statistics**

|   | All   | China | Thailand |
|---|-------|-------|----------|
| <b>Labor supply characteristics of workers</b>                            |       |       |          |
| Female (Yes=1)(%)   | 73.38 | 62.54 | 77.8     |
| Married (Yes=1)(%)  | 59.78 | 61.28 | 59.12    |
| Number of children (maximum)  | 9     | 4     | 9        |
| Live in factory dormitory (Yes=1) (%)                                     | 8.83  | 26.7  | 0.91     |
| <b>Human capital characteristics of workers</b>                           |       |       |          |
| Highest educational qualification (%)                                     |       |       |          |
| Primary school or below   | 26.83 | 7.43  | 35.43    |
| Middle school   | 42.79 | 69.51 | 30.95    |
| High school/Technical school  | 27.71 | 21.96 | 30.25    |
| University  | 2.67  | 1.11  | 3.36     |
| Age (mean in years)   | 30    | 27    | 31       |
| Do you agree that you do not have the skills/training to do your job? (%) |       |       |          |
| Not at all  | 31.08 | 53.75 | 21.11    |
| Not really  | 22.16 | 31.90 | 17.88    |
| More or less  | 39.50 | 9.09  | 52.88    |
| Yes, mostly   | 3.12  | 1.75  | 3.72     |
| Yes, absolutely   | 4.14  | 3.51  | 4.42     |
| Length working in the factory (mean in months)                            | 42.33 | 23.17 | 50.52    |
| <b>Characteristics of the firm</b>  |       |       |          |
| Average number of workers   | 2106  | 2726  | 1565     |

|  | All   | China | Thailand |
|--|-------|-------|----------|
| Proportion of female workers (mean) (%)  | 71.62 | 62.8  | 79.34    |
| Proportion of migrant workers (mean) (%)   | 53.55 | 93.74 | 6.67     |
| Scale for risks related to client-factory relationship (scale: from 1 to 5, where 1 is 'regularly' and 5 is 'never') (mean) <sup>(a)</sup> | 3.82  | 3.53  | 4.07     |
| Scale for factory-related risks (scale: from 1 to 5, where 1 is 'regularly' and 5 is 'never') (mean) <sup>(b)</sup>                        | 3.52  | 3.59  | 3.45     |
| Scale for worker-related risks (scale: from 1 to 5, where 1 is 'regularly' and 5 is 'never') (mean) <sup>(c)</sup>                         | 2.92  | 3.02  | 2.83     |
| Annual turnover rate (mean) (%)  | 6.44  | 7.22  | 5.85     |

### Firm policies on hours of work

|   |       |       |       |
|---|-------|-------|-------|
| Both firm and worker confirmed that there is a policy on hours of work (yes=1) (%)                      | 72.54 | 51.50 | 82.04 |
| Worker responded that he/she was aware of how to refuse overtime (yes=1) (%)                            | 81.43 | 70    | 86.45 |
| Both firm and worker confirmed that workers can reject overtime without fear of reprisal (yes=1) (%)    | 56.15 | 46.18 | 60.61 |
| Both firm and worker confirmed that new workers received training on expected hours of work (yes=1) (%) | 95.73 | 94.48 | 96.44 |

(a) This variable is an index of risks as follows: (i) The purchaser changed the style after placing the order. (ii) The purchaser changed the order on pre-packaged goods at short notice. (iii) The purchaser demanded a price reduction. (iv) The purchaser requested an increase in quantity at short notice.

(b) This variable is an index of risks as follows: (i) Machine breaks down. (ii) Problems with production equipment (eg. needles break). (iii) There is an above average reject level. (iv) Raw materials/components do not arrive on time. (v) The quality of raw materials is not acceptable. (vi) The factory accepts orders that exceed its production capacity. (vii) The factory fails to meet planned production levels. (viii) There is limited ability to adapt capacity to fluctuating orders.

(c) This variable is an index of risks as follows: (i) Workers were absent because of illness. (ii) Workers were absent without giving notice. (iii) Workers demanded more overtime. (iv) There was a shortage of workers during peak periods. (v) There was a shortage of skilled workers. (vi) There were insufficient workers because of a high level of turnover.



**Table 4 – Ordered probit /OLS for ‘how often you work more than 60 hours per week?’**

|   | Ordered probit      | OLS                |
|---|---------------------|--------------------|
| <b>Labor supply characteristics of workers</b>                        |                     |                    |
| Female  | -.2007<br>(-1.12)   | -.1009<br>(-1.17)  |
| Married   | -.3056**<br>(-2.25) | -.1849<br>(-1.74)  |
| Number of children  | .0663<br>(0.51)     | .0779<br>(0.79)    |
| Married X Female  | .5574*<br>(2.62)    | .3721***<br>(2.89) |
| Female X Number of children   | -.1979<br>(-1.44)   | -.1739<br>(-1.58)  |
| Live in factory dormitory   | .2396**<br>(2.21)   | .1861**<br>(2.31)  |
| <b>Human capital characteristics of workers</b>                       |                     |                    |
| Highest educational qualification                                     |                     |                    |
| Primary school and below  | .1550<br>(0.79)     | .0430<br>(0.35)    |
| Middle school   | .1946<br>(1.16)     | .0749<br>(0.90)    |
| High school/technical school  | -.0253<br>(-0.19)   | -.0441<br>(-0.56)  |
| Age   | -.0225<br>(-0.47)   | -.0200<br>(-0.48)  |
| Age-squared   | .0003<br>(0.37)     | .0003<br>(0.38)    |
| Do you agree that you do not have the skills/training to do your job? |                     |                    |
| Not really  | .1731***<br>(1.72)  | .0966<br>(1.39)    |
| More or less  | .2129**<br>(1.97)   | .1222***<br>(1.99) |
| Yes, mostly   | .6322**<br>(2.25)   | .4137<br>(1.80)    |
| Yes, absolutely   | .3571*<br>(2.38)    | .2886***<br>(2.18) |
| Length working in the factory   | -.0008<br>(-0.88)   | -.0003<br>(-0.54)  |

|   | Ordered probit       | OLS                  |
|---|----------------------|----------------------|
| <b>Characteristics of the firm</b>  |                      |                      |
| Number of workers   | .00006*<br>(4.69)    | .00007*<br>(5.51)    |
| Proportion of female workers  | .0243*<br>(5.97)     | .0153*<br>(4.83)     |
| Proportion of migrant workers   | .0239*<br>(4.80)     | 0.0184*<br>(4.81)    |
| Scale for risks related to client-factory relationship                                      | .6805**<br>(2.12)    | .2469<br>(.85)       |
| Scale for factory-related risks   | -.3295*<br>(-4.74)   | -.1512**<br>(-3.13)  |
| Scale for worker-related risks  | -.4544*<br>(-4.03)   | -.2761**<br>(-2.67)  |
| Annual turnover rate  | .0072*<br>(3.38)     | .0062*<br>(3.32)     |
| <b>Firm policies on hours on work</b>   |                      |                      |
| Worker responded that he/she was aware of factory-related how to refuse overtime            | -.3286*<br>(-2.99)   | -.2524**<br>(-2.57)  |
| Both firm and worker confirmed that there is a policy on hours of work                      | -.0665<br>(-0.43)    | -.0397<br>(-0.26)    |
| Both firm and worker confirmed that workers can reject overtime without fear of reprisal    | -.0631<br>(-0.63)    | -.0516<br>(-0.82)    |
| Both firm and worker confirmed that new workers received training on expected hours of work | -.4321**<br>(-2.17)  | -.4669**<br>(-2.25)  |
| Country dummy for China   | -1.2408**<br>(-2.09) | -1.3200**<br>(-2.73) |
| Constant  | -                    | 1.0205<br>(0.95)     |
| Number of observations  | 930                  | 930                  |
|   | Pseudo R2=0.1326     | R-squared=0.2358     |
| <b>The Wald Test/F-test</b>   |                      |                      |
| Labor supply characteristics  | Chi2(7)=22.22*       | F(7,9)=3.69**        |
| Human capital characteristics   | Chi2(9)=17.45**      | F(9,9)=2.26          |
| Characteristics of the firm   | Chi2(7)=812.21*      | F(7,9)=159.25*       |
| Firm policies   | Chi2(4)=17.02*       | F(4,9)=3.66**        |

Note: \*(\*\*)(\*\*\*): statistically significant at .01(.05)(.10) level; in the ordered probit model, figures in parentheses are Z-values and in the OLS model, figures in parentheses are *t*-values. Standard errors are clustered

at the firm level. The reference category for education is 'workers with university education'. The reference category for Do you agree that you do not have the skills/training to do your job? is 'not at all'.

**Table 5: Ordered probit/OLS for ‘how often do you work more than six days in a row?’**

|   | Ordered probit      | OLS                 |
|---|---------------------|---------------------|
| <b>Labor supply characteristics of workers</b>                        |                     |                     |
| Female  | -.3463*<br>(-3.41)  | -.2130**<br>(-2.60) |
| Married   | .3261**<br>(2.12)   | .0841<br>(0.69)     |
| Number of children  | -.1159<br>(-0.86)   | -.0224<br>(-0.35)   |
| Married X Female  | .0112<br>(0.05)     | .0785<br>(0.52)     |
| Female X Number of children   | .0868<br>(0.71)     | .0103<br>(0.21)     |
| Live in factory dormitory   | .2966**<br>(2.18)   | .1792<br>(1.31)     |
| <b>Human capital characteristics of workers</b>                       |                     |                     |
| Highest educational qualification                                     |                     |                     |
| Primary school and below  | -.5876<br>(-1.08)   | -.4023<br>(-.96)    |
| Middle school   | -.7258<br>(-1.30)   | -.4570<br>(-1.02)   |
| High school/technical school  | -.8305<br>(-1.58)   | -.4799<br>(-1.11)   |
| Age   | -.1197**<br>(-2.30) | -.0422<br>(-1.78)   |
| Age-squared   | .0018**<br>(2.48)   | .0007<br>(1.63)     |
| Do you agree that you do not have the skills/training to do your job? |                     |                     |
| Not really  | .1222<br>(1.30)     | .0479<br>(0.91)     |
| More or less  | .0263<br>(0.25)     | -.0003<br>(-0.01)   |
| Yes, mostly   | .5099<br>(1.63)     | .2309<br>(0.87)     |
| Yes, absolutely   | -.0997<br>(-0.40)   | -.0219<br>(-0.15)   |
| Length working in the factory   | .0013<br>(0.89)     | .0007<br>(0.80)     |

|   | Ordered probit      | OLS                  |
|---|---------------------|----------------------|
| <b>Characteristics of the firm</b>  |                     |                      |
| Number of workers   | -.00002*<br>(-2.67) | -.00001<br>(-1.18)   |
| Proportion of female workers  | .0235*<br>(5.06)    | .0113*<br>(3.25)     |
| Proportion of migrant workers   | -.0086**<br>(-2.50) | -.0075**<br>(-3.16)  |
| Scale for risks related to client-factory relationship                                      | 1.0778*<br>(5.11)   | .7993*<br>(3.45)     |
| Scale for factory-related risks   | .0332<br>(0.47)     | -.0349<br>(-0.52)    |
| Scale for worker-related risks  | -.3854*<br>(-4.01)  | -.2949**<br>(-2.91)  |
| Annual turnover rate  | -.0007<br>(-0.41)   | -.0027<br>(-1.44)    |
| <b>Firm policies on hours of work</b>   |                     |                      |
| Worker responded that he/she was aware of how to refuse overtime                            | -.3770**<br>(-2.39) | -.2554***<br>(-2.10) |
| Both firm and worker confirmed that there is a policy on hours of work                      | -.2501**<br>(-1.96) | -.1625<br>(-1.61)    |
| Both firm and worker confirmed that workers can reject overtime without fear of reprisal    | -.0261<br>(-0.32)   | -.0016<br>(-0.04)    |
| Both firm and worker confirmed that new workers received training on expected hours of work | .1411<br>(0.64)     | .0669<br>(0.35)      |
| Country dummy for China   | 2.7575*<br>(8.68)   | 1.8846*<br>(5.42)    |
| Constant  | -                   | -.3728<br>(-0.33)    |
| Number of observations  | 931                 | 931                  |
|   | Pseudo<br>R2=0.1319 | R-squared=0.1604     |
| <b>The Wald Test/F-test</b>   |                     |                      |
| Labor supply characteristics  | Chi2(7)=102.74*     | F(7,9)=2.65**        |
| Human capital characteristics   | Chi2(9)=198.07*     | F(9,9)=2.29          |
| Characteristics of the firm   | Chi2(7)=1026.55*    | F(7,9)=10.9*         |
| Firm policies   | Chi2(4)=9.06***     | F(4,9)=1.88**        |

Notes: See notes to Table 4.

