Literature Review of ECEC Labour Market

Understanding and Addressing Workforce Shortages in Early Childhood Education and Care (ECEC) Project

**Child Care
Human Resources
Sector Council**

Canada

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INTRODUCTION

About the Project

Recruitment and retention are long-standing and well-documented challenges facing the early childhood education and care (ECEC) sector. An accurate understanding of workforce shortages—the number of ECEC workers needed across Canada—and the implications of these shortages is critical in order to address these challenge. To achieve this, the Child Care Human Resources Sector Council (CCHRSC) developed the *Understanding and Addressing Workforce Shortages in ECEC Project*. Funded by Human Resources and Skills Development Canada, the project focused on:

- Defining current workforce shortages by exploring the factors that influence supply and demand of ECEC workers;
- Reporting on available data and data deficiencies;
- Documenting the impact of current shortages on the sector, labour market engagement, and on the economy;
- Identifying current strategies and other options for addressing ECEC worker shortages; and
- Exploring the feasibility of developing a forecasting model to predict future shortages.

The CCHRSC engaged the Centre for Spatial Economics (C$_4$SE), a consulting organization created to improve the quality of spatial economic and demographic research in Canada, to conduct the project research and create reports designed to meet the project objectives.

Research Approach

Between 2008 and 2009, the C$_4$SE worked to define current shortages of ECEC workers, assess their impact, and explore the feasibility of predicting future shortages. Most specifically, C$_4$SE:

- Conducted 18 key informant interviews with provincial/territorial/municipal government officials in the ministries responsible for child care or their representatives, along with other key stakeholders and analysts of the ECEC sector;
- Conducted a review of literature of factors that influence the demand for and supply of the early childhood education and care workforce; and
- Analyzed a variety of data provided by municipal, provincial, and territorial governments in addition to publicly available data from Statistics Canada, on topics including: employment, labour force, unemployment rate, wages, and education.

By considering factors such as the available workforce, creation of new child care spaces, projected birth rates, and parental employment patterns, this project will determine the current shortages facing the sector.

Project Reports

The information gathered for the *Addressing Workforce Shortages in ECEC Project* has been used to create a variety of reports that help define key findings. The **Literature Review of the ECEC Labour Market** summarizes available evidence regarding the factors that influence the demand and supply for ECEC workers and is the second in a series of reports produced, including:

- **Literature Review of Socioeconomic Effects and Net Benefits:** This report examines the literature on ECEC and its' impact on children, their parents and society in order to determine the socioeconomic implications of workforce shortages in ECEC. The implications of workforce shortages are inferred from the available literature, as the academic literature available does not directly address this issue;

- **Estimates of Workforce Shortages:** This report examines the literature on ECEC workforce shortages, describes the technique that is used to estimate workforce shortages in the ECEC sector and estimates the economic costs of current workforce shortages;
- **Recruitment and Retention Challenges and Strategies:** This report examines recruitment and retention challenges in the ECEC sector from an economic and human resource management perspective. Research into these challenges is examined and proposals as to how to reduce the recruitment and retention problem are proposed;
- **Data and Model Feasibility:** This report examines existing data sources and provides an assessment of the data gaps and limitations of available data. The feasibility of developing occupational demand and supply models for the provinces and territories is also explored; and
- **Executive Summary : Understanding and Addressing Workforce Shortages Project:** This report contains background information on the *Addressing Workforce Shortages in ECEC Project* and a brief, plain language executive summary of each of the reports produced.

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Note: The authors accept all responsibility for any errors or omissions. The views in this report reflect those of the authors and do not necessarily reflect those of the CCHRSC.

Document Overview
The *Literature Review of the Early Childhood Education and Care (ECEC) Labour Market* is divided into three main sections:

- **Section 1: Demand for Early Childhood Education and Care Workers:** This section analyzes the main components of ECEC worker demand including: demand for ECEC, demand for quality ECEC and labour mobility.
- **Section 2: Worker Supply:** This section examines the supply of ECEC labour. The supply of labour is determined by the number of ECEC workers and the hours they work. The number of available ECEC workers depends on the number of workers who choose to remain in the sector and how many enter the workforce.
- **Section 3: Wages:** This section discusses two major conundrums of the ECEC labour market: Why are ECEC wages so low? and Why have they not increased along with demand? This section also looks at how employer characteristics influence wages.

SECTION 1: DEMAND FOR EARLY CHILDHOOD EDUCATION AND CARE WORKERS

Beach et al. (2004) summarize what determines the demand for ECEC workers:

> The demand for the child care workforce is obviously driven by the demand for child care, but also by provincial/territorial regulations that stipulate child-staff ratios and required proportion of staff with specific qualifications, turnover rates and other job opportunities in the broader ECEC sector.

Provincial/territorial regulations on child-staff ratios mean that demand for ECEC services translates into an almost equivalent demand for ECEC workers. As a result, demand for ECEC services is the most important consideration when analyzing the demand for ECEC workers. Provincial/territorial regulations, along with parental demand, also affect the demand for quality ECEC. Labour mobility issues, such as turnover rates and occupational/geographical mobility, play an important role in determining replacement demand or the number of job opening required to replace workers who change occupations or leave the labour force. Thus the factors affecting the demand for ECEC workers can be divided into the following areas:

1A. Demand for ECEC services (quantity)
1B. Demand for quality ECEC
1C. Labour mobility

Section 1A: Demand for Early Childhood Education and Care Services

As discussed above, the demand for early childhood educators (ECEs) is inextricably linked to the demand for services due to child-staff ratio regulations that prevent child care centres from increasing child intake without increasing staff accordingly. Child care centres also cannot substitute technology for workers, as can happen in other industries faced with an increase in demand (Warner et al.'s 2003 U.S. study). Yet, although there is considerable literature examining the demand for ECEC services, there is comparatively little on the demand for ECEC workers. Therefore, in order to gain insight into the factors affecting the demand for ECEC workers, it is helpful to look at the theoretical and empirical literature on demand for ECEC services.

The ECEC sector provides two basic services: early childhood **education** and early childhood **care**. This decomposition is not to say that one is inherently more important than the other, or that education can be provided in isolation from care, or that these services in combination do not provide additional benefits that exceed the sum of these components parts. For analytical purposes, however, it is helpful to decompose the services provided into component parts in order to understand what drives the demand for ECEC services and workers. This is because the demand for the **education** and **care** aspects of ECEC services will have different impacts on different parts of the broader ECEC workforce. For example, regulated child care centres will clearly be influenced by the demand for both services. Regulated family child care will also likely be influenced by the demand for both, but with a relatively smaller emphasis on the demand for educational services, since on average fewer people with college or university ECE training work in this part of the sector. And the unregulated sector is more likely to be directly influenced by the demand for care.

Most of the research makes no distinction between **education** and **care.** However, analysis of the demand for quantity of ECEC services tends to implicitly focus on the attributes related to care. In the analysis of demand for ECEC quality, educational services are implicitly (if not explicitly) included.

The distinction between **education** and **care** is important because each will influence the overall demand for services and therefore the demand for early childhood educators. And, as Barnett and Yarosz (2007) point out, over the past half century, preschool participation in the United States has increased at the same pace for children whether or not their

mothers are employed outside the home. The researchers identify the rising demand for the education of young children by all parents as the primary reason for the increase.

While there are some similarities between the factors that influence the demand for early childhood **care** and the demand for early childhood **education**, there are also some notable differences. As a result, the two are discussed separately in this paper.

Demand for ECEC services or quantity of child care is discussed on pages 8-15 below, while demand for ECEC quality or 'education and care' is discussed on pages 16-18.

Demand for ECEC Services – What Factors Influence Primary Caregiver's Decision to Use Non-Parental Care?
At the most basic level all young children need care, whether parental or non-parental. There has been considerable research into the factors that influence the primary caregiver's decision to use non-parental care, the type of care selected and quantity used (see Appendix for a list of the factors that have been found to affect the demand for the quantity of services). Notably, the research has primarily focused on the decision to use services that enable the mother to be in the labour market. This focus implicitly means that the research is primarily concerned with early childhood care and the quantity of those services rather than early childhood education, although some research explicitly includes quality as an aspect of care that parents consider when deciding to use non-parental child care.

According to Chevalier et al. (2006), the economic model underlying much of the empirical work in the ECEC literature is a **basic labour supply model**. This model is set within the wider framework of "new household economics". New household economics assumes gendered divisions of labour (Becker's 1981 and 1996 U.S. studies). Becker theorizes that the gendered division of labour results in specialization within the household in order to maximize the returns to human capital. According to this theory, the household makes decisions regarding the gendered division of labour taking into account the availability and cost of child care, which is compared to the mother's potential income from paid work. The basic labour supply model is augmented with the child care dimension in order to examine the joint decision regarding the mother's labour force participation and the use of child care. The augmented model includes factors that influence the amount of non-parental child care needed, such as:
- the availability of formal and informal child care;
- the ability to afford formal care; and
- the parents' and the children's preferences and tastes.[1]

Both the economic and non economic factors influencing parents' decisions to use ECE services are discussed below.

Economic Factors Influencing Decisions to Use Non-Parental Care

Mother's Reservation Wage & Take-Home Pay
The economic benefits from working are delivered via wages after income taxes, and after work- and child care-related costs have been taken into consideration. The lowest wage needed to entice a person to enter the labour force is called their "*reservation wage*". The mother's reservation wage depends on non-working income and domestic commitments, such as children. The presence of children in the household increases the level of the mother's reservation wage. Based on economic reasoning, the model predicts that the mother will substitute[2] between formal and maternal care until her wage rate equals the net benefit of maternal care.[3]

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[1] In the literature, the terms "formal" and "informal" take different meanings. Some use "formal" to represent child care centres, while "informal" represents family child care; others use "formal" to represent child care centres and family child care, and "informal" to represent what is commonly referred to as babysitters and non-parental kin-provided care.

[2] Substitute is an economic term that implies that one good or service can be used as a replacement or substitute for another good or service. If they are perfect substitutes then the consumer derives the same level of benefit from each good or service. In the case of child care the parent will adjust consumption of child care services (substitute between maternal and non-maternal care) until the net benefits

Factors that raise a mother's take-home pay (after work- and child care-related costs) will increase the probability of labour force participation and the use of child care. For example, a rise in before-tax income, a decline in personal income tax rates, an increase in employment income deductions and lower transportation costs will all boost take-home pay and therefore increase labour force participation and the use of child care by mothers. Factors that lower the price of child care paid by the household are expected to raise the probability that child care services will be used and the mother will participate in the labour force. For example, a lower fee or an increase in government subsidies will boost child care use and mothers' participation rates.[4]

Availability of Informal (Zero-Cost) Child Care Options
The availability of informal (zero-cost) care options, such as other adults in the household or the neighbourhood, or older children in the household, is expected to have a negative effect on the use of formal child care.

Impact of Partner Earning, Tastes, and Preferences
The impact of the partner's earnings on the decision to use formal child care is ambiguous due to the joint nature of the decision to become employed and use formal child care. However, important non-observed components of this decision include tastes and preferences which can be influenced by observable factors such as the partner and mothers' age, ethnicity, hours of work, and level of education.[5]

Price of ECEC
Numerous studies have examined the impact of ECEC costs on mothers' labour force participation decisions. They consistently find that mothers' employment decisions are inversely related to the price of ECEC—a higher price is related to lower labour force participation and lower demand for the service. One way to measure how much demand changes based on a change in price is called the *price elasticity of demand*.[6] This measure indicates how much demand will change in percentage terms from a one percent price increase. Since a higher price normally leads to a decline in demand, the price elasticity is typically a negative number. However, there is a large range of estimated outcomes for child care.

Estimates of the price elasticity of demand range from very small to quite large.[7] Relatively small elasticities are reported by Blau and Hagy's (1998) U.S. study (-0.34) and Chaplin et al.'s (1999) U.S. study (-0.41 for centre-based care). In contrast, Connelly and Kimmel's (2003) U.S. study, Powell's (2002) Canadian study, and Cleveland et al.'s (1996) Canadian study all report estimates of -1.0 or larger.[8] Powell (2002) estimated price elasticities of the various child care arrangements ranging from -1 for day-care centres to -3 for childminders in their home. Doiron and Kalb (2005) found for Australia that the price elasticities of demand for formal care ranged from - 0.3 to - 0.6 for couples, depending on the age of the child. Michalopoulos and Robins' (2000) combined U.S. and Canadian study reports price elasticities of -1.08 for formal child care centres. Notably, most of the above studies that examined Canadian data showed the largest price elasticities of all the countries examined, implying that parents in Canada are more price-sensitive than parents in other countries.

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derived from adding one unit of time of non-maternal care (which for working mothers is the net benefits of working one extra unit of time) equals the net benefit of providing one unit of time of maternal care. Otherwise the mother could improve her total benefits or utility by adding or reducing the number of units of maternal/non-maternal care.

[3] Chevalier et al. (2006).

[4] As pointed out by Chevalier et al. (2006), in most parental choices the price of child care is a function of quality, but most empirical models ignore the quality aspects and assume they are unobservable, but uniform.

[5] Chevalier et al. (2006).

[6] Since this elasticity refers to the price and demand for the service, it is also called the "own price elasticity."

[7] The distinction between small (inelastic) and large (elastic) price elasticities becomes important when considering the demand for ECEC sector workers and their wages. If demand is price elastic, then a rise in wages that is passed on to higher fees will result is a larger drop in demand for services.

[8] Baker, Gruber and Milligan's (2005) Canadian study.

The price sensitivity of Canadian parents might be due to high fees as price elasticity is often higher at higher prices.[9] For example, when the price of gasoline is 50 cents per litre, a 10% price increase to 55 cents does not trigger a very large demand response. However, at a price of $1.50 per litre, a 10% price increase to $1.65 can cause a much larger demand reaction. Furthermore, as highlighted by the OECD country note on early childhood education and care in Canada, subsidies and other government funding do not usually meet the full cost of providing ECEC and parents must therefore pay out of pocket.

According to the Canada Background Report (Social Development Canada, 2003), on average, approximately 50% of child care centre revenues come from fees paid by all parents (subsidized and non-subsidized) and in some instances, parent fees may represent as much as 80% of these revenues. In many countries, fees paid by parents represent a smaller share of total costs, so parents in Canada are facing much higher fees than parents elsewhere, which might explain their greater price sensitivity.

Researchers find that demand for ECEC rises with women's wages and that wage elasticity (percentage change in demand relative to a one percent increase in wages) is positive for both formal and informal child care. Choné et al.'s (2003) French study estimated wage elasticities of 0.7 to 0.77, while Cleveland et al. (1996) estimated an elasticity of 0.18 for Canada, and Ribar's (1995) U.S. study found a range from 0.14 to 0.76. Blau and Hagy's (1998) U.S. study found a wage elasticity of 0.67. These estimates put Canadian wage elasticities below those for other countries.

The combination of a high price and low wage elasticity suggests that price changes will dominate the demand for ECEC. If the relative price of ECEC services in Canada rises, the demand would drop more in Canada than elsewhere. Conversely, if prices fall, demand would increase by more than elsewhere. It would require wage gains of roughly 5.6% by mothers to offset a one percent relative price increase. This effect is also illustrated by using Canadian data for the median hourly wage rate for women from the Labour Force Survey (LFS), and the CPI for ECEC services. Using the Canadian elasticities, the rise in demand should have been 4.6% from 2000 to 2007, while using the elasticities found by Blau and Hagy for the U.S., the increase should have been 3.9%.

Researchers find that the responsiveness of ECEC demand with respect to income, including non-wage income, is uniformly smaller than the wage elasticities discussed above. Ribar (1995) found for the U.S. that income elasticities were small but positive in the range of 0.04 to 0.11 for mothers' income. For Australia, Doiron and Kalb (2005) found income elasticities ranging from 0.2 to 0.4 for formal care and from 0.1 to 0.2 for informal care. Blau (2001) concludes that income elasticities were positive for formal care, but negative for other forms of child care. However, it is important to note that low income elasticities could be related to parents having a high elasticity for child care quality versus quantity, as implied by work by Becker and Lewis (1973).

Non-Economic Factors Influencing Decisions to Use Non-Parental Care
Brayfield and Hofferth's (1995) U.S. study demonstrates that non-economic factors influence the purchase of child care by employed mothers. A variety of other studies examined specific factors, detailed below.

Migration Status
Leibowitz et al.'s (1988) U.S. study found that women with non-U.S. backgrounds are more likely to have relatives care for their children. Rammohan and Whelan (2006) found for Australia that the demand for child care varies by migration

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[9] See Wikipedia.org & netmba.com/econ/micro/demand/elasticity/price. The discussion in the text referred to the case where the price elasticity of demand changes depending on the price point. A number of other factors can affect the price elasticity of demand. If there are more substitutes, typically there will be higher price elasticity. The larger the proportion of income required to purchase the item, the higher the price elasticity. The more necessary a good is, the lower the price elasticity. The longer time period considered the larger the price elasticity since consumers have time to adjust. Permanent versus temporary price changes have different elasticities. The broader the definition of the good or service the lower the price elasticity. For example, the price elasticity of one child care centre's services will be higher than for all child care centres or for all child care services.

status. Being an immigrant from an English-speaking country increases the likelihood that a woman pays for child care, whereas being an immigrant from a non-English-speaking country has no impact on paying for care compared with Australian-born mothers.

Cleveland et al. (1996) examined Canadian child care and found that mothers who are not born in Canada and who speak English are less likely to use market care. It is not clear why there is such a difference between countries in the interaction between migration status (or ethnicity) and the use of child care. Therefore, the results are less powerful than a consistent finding would be regarding the impact of these factors on ECEC.

Number of Dependent Children
The number of other dependent children in the family is also likely to have a significant effect on ECEC arrangements. Lehrer's (1989) U.S. study points out that if other children in the household are also in child care, the parents are less likely to be able to use a child care centre because their resources (time, energy and money) are diluted. The presence of another child needing care also introduces incentives to rely on babysitters or relatives because these modes of care typically involve substantial economies of scale. Lehrer (1989) found that the presence of more than two siblings decreases the probability of choosing centre care for a preschooler.[4] However, the age of the sibling also matters when the preschooler has one sibling. Since parents tend to make the same arrangements for all children, the presence of a sibling aged 3 to 5 increases the probability that a preschooler is enrolled in centre care compared to the presence of either a younger or older sibling.

Age of Mother
Veum and Gleason's (1991) U.S. study found that there are some notable differences in the child care arrangements made by younger and older women. While relatives frequently provide child care for both younger and older women, care by a child's sibling is more common among older women (standardized for the age of the child). The percentage of young women who use child care centres for their infants is almost three times that for older women.

Mother and Fathers' Labour Force Status
Veum and Gleason found that a mother's and father's labour force status and the number of hours worked are important factors in determining whether a child is in care and how many hours a week are spent in care. For most mothers of preschool-aged children, the choice of whether to work depends on the availability of child care, and the cost and availability of the service can restrict the amount of time they are able to work (Bloom and Steen,1990 [U.S.]). In a study examining Canada, Cleveland et al. (1996) found that market child care is more likely to be chosen if the father works full-time. Non-market child care is an attractive option for families with the child's grandmother or another female adult living in the household; the presence of another female adult in the household has a negative effect on the probability of using market care.

Education of Mother
Leibowitz et al.'s (1988) U.S. study found that women who have higher education are more likely to work, and they are more likely to provide the most age-appropriate care for their children. The education effect, however, is more ambiguous for the less-educated, low earning mothers since they do not have the buying power to afford the most age-appropriate care.

Types of ECEC – What Factors Affect the Type of Non-Parental Child Care Parents Choose?
A related area of research examines factors that affect the type of non-parental child care parents choose. As with the decision to use ECEC services, these studies found that the price of child care influences the type of service selected. However, price is just one of many factors parents weigh when deciding what kind of child care to use. Parents frequently cite quality, safety, convenience and availability as the reasons for their selection of a particular type of child care.[10] Powell's (2002) Canadian study estimates large price elasticities for sitter care (greater than -3.0). In contrast,

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[10] Davis and Connelly's (2005) U.S. study.

Blau and Hagy's (1998) U.S. estimates for different modes of care range from -0.07 to -0.34, the largest being for family home-based child care.

Price of Formal vs. Informal Care
Since formal and informal care can be thought to be substitutes for early childhood care services (less so for educational services), a drop in the price of informal care will lower the demand for formal care. This relationship has been estimated by several researchers. This elasticity is called a "*cross-price elasticity*". Michalopoulos and Robins' (2000) U.S. and Canadian study reports that centre-based care prices affect the use of relative and non-relative care, but the prices of other types of care have negligible cross effects. Powell's (2002) Canadian study reports cross-price elasticities of centre care of roughly one on either relative or husband-based care. Blau and Hagy's (1998) U.S. study reports significant cross-price effects, with the proportionate effects spread out fairly equally across competing types of care.

How Price of Child Care is Measured
Duncan, Paull and Taylor's (2001) U.K. study suggests that how the price of child care is measured can have an impact on the estimation results. Failure to control for hours and quality in the price measure does not appear important for estimating the responsiveness of demand for formal paid care for preschool children. However, the omission of quality controls generates an overestimate of the elasticity for school-aged children during the school term. The researchers found strong evidence that failure to control for hours and quality effects in the price measure leads to a significant overestimate of its impact on the hours of formal care used for both preschool and school children.

Full-Time vs. Part-Time Employment of Parents
Powell's (1998) Canadian study distinguished between how part-time and full-time work is affected by the costs of care. She found that the "marginal cost" of paid care and the availability of unpaid care decrease with hours worked, thus implying that the use of paid care is a function of hours worked.[11] Powell found that the costs of care have a stronger negative impact on the probability that a mother works full time. She found that for both married and single women, part-time employment is less sensitive than full-time employment to the price of care. This differential effect of the price of care on full-time versus part-time employment is consistent with earlier studies, which established that informal arrangements for care are more common among mothers working part time (Lehrer, 1983, 1989 [U.S.]), while mothers working full time are more likely to choose centre-based care/nursery school (Lehrer, 1989 [U.S.]; Leibowitz et al., 1988 [U.S.]; Ribar, 1992 [U.S.]). More recently, Connelly and Kimmel's (2003) U.S. study found that the probability of using centre-based care increases with the full-time employment of mothers, and mothers employed part-time show a greater reliance on care provided by relatives. This may be because many child care centres do not provide part-time spaces, so access is an issue.

Non-Standard Employment
Kimmel and Powell's (2001) U.S. study found that being a non-standard worker (e.g. part-time, temporary, or shift worker, etc.) significantly reduces the likelihood of using formal modes of child care, which in general are less likely to offer flexible arrangements. The researchers found that after controlling for the price of care, the mothers' work patterns played an important role in the type of care selected. Mothers who worked in standard jobs were found to be more price sensitive than mothers who worked in non-standard employment. The study showed that an increase in the probability of non-standard work significantly reduces the probability of choosing either of the two formal care options of centre and sitter care, while it significantly increases the likelihood of using parent care. The responsiveness of demand with respect to price for centre and sitter care is significantly larger than for relative care. The study estimates price elasticities for centre, sitter, and relative care of –1.2, –1.7, and –0.1 respectively.

Kimmel and Powell (2001) found that the presence of a young child aged 0–2 reduces the likelihood of using centre care combined with either standard or non-standard work, while it increases the likelihood of using sitter or relative care in

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[11] Marginal cost is the change in total costs that occurs from adding a small amount to the quantity consumed. Mathematically, marginal cost is expressed as the derivative of the total cost function with respect to quantity.

standard employment. This could be due to a lack of accessibility. Overall, the presence of additional preschoolers in the household reduces the likelihood that the mother will work. And the presence of another adult in the household significantly increases the likelihood that a mother with young children will choose to use care by a relative combined with either standard or non-standard employment.

Folk and Beller's (1993) U.S. study examined the effect of variable work schedules for employed mothers on the combination of part-time/full-time employment status and the use of non-market versus market child care. Their results showed that mothers with variable work schedules were more likely than other women to combine part-time work with either non-market care or market care. They also found that being married or having a grandmother nearby increases the likelihood of choosing combinations of work with non-market care. Brayfield's (1995) and Casper and O'Connell's (1998) U.S. studies examined the impact of non-standard work schedules on the probability of care by the father in married households. Both found that the probability of care by the father increases if the mother works a non-day shift. Brayfield (1995) — who includes multiple non-standard work schedule variables — also found that weekend work by mothers significantly increases care by the father but that rotating schedules have no significant effect. More recently, Chaplin et al.'s (1999) U.S. study examined the choice among centre care, home care (sitter), relative care, and parent care. The authors reported price elasticities of - 0.41, 0.23, and -.02 for centre, sitter, and relative care, respectively. They also found that mothers who work in a non-day job are significantly more likely to use relative or parent care versus centre care.[12]

Non-Employed Mothers

Davis and Connelly's (2005) U.S. study examined the differences in child care choices made by non-employed and employed mothers. If they use child care, non-employed mothers tend to choose centre care and preschools. Non-employed mothers, however, rarely use family child care. These results suggest that non-employed mothers select centre care and preschool for their perceived social and educational benefits. They further suggest that family child care's role is primarily one of employment facilitation among mothers who are in the labour force. Employed mothers must make decisions taking price, convenience, and educational environment in choosing care for their youngest children.

Davis and Connelly (2005) also found that the use of centre care increases with the age of the child and with income. This seems to support the view that mothers perceive centre care as having beneficial educational and social effects on children approaching school age. The results are similar to those of Hotz and Kilburn's (1992) U.S. study showing that non-employed mothers are sensitive to the price of both centre-based and family child care because these services are substitutes to some degree. The use of centre care by non-employed mothers is negatively associated with the average price of a centre (own price elasticity) and positively associated with the average price for family child care (cross price elasticity). Higher prices for family child care are associated with less use of this type of care. The availability of relatives and friends was a strong predictor of behaviour for both employed and non-employed women. Having relatives available made it more likely that employed mothers used relative care; the availability of friends or neighbours reduced both centre and relative care.

Kimmel's (1995) U.S. study provided estimates of the employment responsiveness to child care subsidies for mothers in poverty, with a focus on single mothers. The results are strongest for white single mothers, who exhibit substantial responsiveness to subsidies. The average employment probability for this subgroup increases by 132% when free care is provided, and by 105% with a sliding-scale fee subsidy.

Household Income

If centre-based care is regarded as optimal for preschool-aged children, an increase in a household's income would be expected to raise the probability of relying on this type of care. Kimmel and Powell's (2001) U.S. study found that mothers with higher levels of non-labour income (income not from current work, including government support payments and investment income, etc.) are significantly more likely to use centre, sitter, or relative care and are

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[12] Kimmel and Powell's (2001) U.S. study.

significantly less likely to use care by a parent. Earned income, however, only has a significant effect on relative care. Mothers with higher wages are less likely to rely on care by a relative. The results of the study, however, did not show that the education of the mother had a significant effect on child care choices.

Lehrer's (1989) U.S. study specifically examined the choice of type of care for preschool-aged children and found that an increase in a mother's wage raises the probability of relying on centre care rather than on unpaid care. A study of U.S. child care arrangements and costs by Veum and Gleason (1991) made a number of findings regarding family income and the use of child care. Women in families with the highest income levels were more likely to use centre-based care than families in other income ranges because these families can afford more expensive forms of care. Families with lower income levels are comparatively more likely to use care by "other relatives". This result is similar to what is reported by the Australian statistical agency, where higher income families use more child care services. For Europe, Wrohlich (2005) found income has a positive effect on the demand for care, while some authors such as Del Boca and Vuri (2005), and Cleveland et al. (1996) for Canada, found positive yet statistically insignificant effects of non-wage income on the use of centre-based care.

Age of Child

Kimmel and Powell's (2001) U.S. study found that after controlling for prices, having an infant significantly reduces the likelihood of using centre care and significantly increases the probability of choosing care by a sitter or relative. As discussed by Brown-Lyons et al. (2001), a number of other U.S. studies found similar patterns of use, with infants and toddlers more likely to be in unregulated home-based child care than preschoolers. The authors suggest that this may be partly because of reduced availability and higher cost of centre care for infants and toddlers. Kimmel and Powell (2001) also found that the presence of an additional preschooler in the family significantly increased the use of centre care. Veum and Gleason (1991) found that the age of the youngest child in a family has a bearing on the type of child care arrangements used by mothers. The type of child care arrangement also depends on the age of the child.

Availability and Accessibility of ECEC

There is evidence of rationing of ECEC services in several countries. This means that services are not available to all parents who would like to use them. A few studies have explicitly investigated the effect of rationing. Kreyenfeld and Hank (2000) argue that in the German context of low availability and low prices of care, the availability of, rather than the price of care, should have an impact on women's employment rates. Spiess and Buchel (2003) found a significant link between the availability of full-time spaces and mother's employment in West Germany. Wrohlich (2005) examines access restrictions in Germany and finds a substantial degree of rationing and excess demand. Access restrictions were explicitly modelled by Chevalier and Viitanen (2004) in a study on the demand for child care in the U.K. They found evidence for considerable excess demand (shortage of child care spaces). Davis and Connelly (2005) found that availability and accessibility impact choice for the U.S.

Wrohlich's (2006) German study explicitly incorporates information on whether child care is rationed. She finds that increasing the number of child care spaces is more effective in increasing the demand for services and increasing employment than a decrease in the fees paid by parents. Kornstad and Thoresen's (2006) Norwegian study showed that decreasing fees was slightly less expensive per one per cent of labour supply increase of mothers than abolishing the queues.

Moreover, availability is important in understanding the effect of other factors on demand for services. For example, it has been shown that rationing is important in determining the effect of price on demand for child care and labour supply. Del Boca and Vuri's (2005) Italian study finds that the price of child care has no significant effect on labour force participation for households that face child care rationing. But they find a significant negative effect of the price of child care on the labour force participation of those mothers who are not rationed. Similarly, Gustafsson and Stafford's (1992) Swedish study finds elasticities close to zero for households where child care is rationed, but very high negative elasticities for households who are not rationed in their choice of child care. If households are restricted in their child care choice, the true price effect is difficult to measure and the estimated price elasticity seems biased towards zero.

Lehrer, Santero and Mohan-Neill (1991) found a positive effect of employer-sponsored child care on hours worked and attachment to the employer in the nurses' labour market in the U.S. However, the effects of different types of employer-sponsored assistance—onsite child care facilities, off-site facilities, assistance in obtaining or paying for services—were not analyzed separately.

Government Policy

Kamerman's (2003) study of Western countries indicates that ECEC policies include a range of government actions designed to influence the supply and/or demand of services. These government activities include:

- direct delivery of ECEC services;
- direct and indirect financial subsidies to private providers, such as grants, contracts, and tax incentives; and
- direct and indirect financial subsidies to parents, such as cash benefits and allowances to pay for the services, tax benefits to offset costs, or cash benefits that permit parents to stay at home (and stop working) without major loss of income.

ECEC policies can be considered a subset of family-related policies. For example, maternity and parental leave provisions determine when parents will seek care for their child. With an expansion of leave provisions in Canada, the age of many children entering child care has increased. In turn, this has reduced the need for the highest staff-child ratios.

As discussed by Gupta et al.'s (2000) Nordic study, government family-related policies affect the demand for child care. In countries without family-friendly policies, a negative trade-off between women's labour supply and fertility should be expected because the costs of having children increase with the earnings potential of the mothers. However, family-friendly policies loosen this trade-off. Maternal and parental leave reduce the immediate income loss from having a child. To the extent that these leaves facilitate a more permanent attachment to the labour market, there may also be long-term effects. Further subsidizing child care reduces the costs of having children. Simple correlations between women's employment rate and fertility in a number of countries indicate that family-friendly policies seem to have had an effect on this relationship.

Public policy may also impact parents' choices through its effect on the supply and quality of ECEC, and because mandated -child-staff ratios affect the price of different types of settings. Michalopoulos and Robins' (2000) U.S. and Canadian study found that tax subsidies have the largest effect on non-relative, non-centre-based care.

Section 1B: Early Childhood Education and Care Quality

Research suggests that high quality ECEC is instrumental in childhood development, particularly for disadvantaged groups. Blau (2001) provides an extensive overview of the child care market in the U.S. with a large concentration on the issue of quality. Other reviews of child care quality by Hayes, Palmer, and Zaslow (1990, [U.S.]), Lamb (1998, [U.K.]), and Love, Schochet, and Meckstroth (1996, [U.S.]) note that there are two distinct concepts of quality in the literature:

- The first type is variously referred to as "process" quality, "global" quality, and "dynamic features of care" and characterizes the interactions between children and their caregivers, their environment, and other children. For the purposes of this report, the term **process quality** will be used.
- The second type is called "structural" quality or "static features of care" and refers to characteristics of the environment such as the child-staff ratio, group size, teacher education and training, safety, staff turnover, and program administration. For the purposes of this report, the term **structural quality** will be used.

The above surveys argue that **process quality** is more closely related to child development than **structural quality**. Despite the widespread agreement on the importance of process quality, there is a lack of data available on process quality measures. As a consequence, researchers tend to rely on structural measures under the assumption that the two types of quality are related.[13]

Quality and ECEC Choice

In recent years the traditional measures of quality, such as child-staff ratios or group size, have come under attack in academic circles. Blau's (1998, 2000 and 2001) U.S. studies find that the easily observed inputs, such as group size, child-staff ratios and teacher qualifications, are correlated with quality, yet after they are taken into account, many unmeasured centre-specific differences in the quality of formal care remain.[14]

In addition, Mocan's (2001) U.S. studies compared consumer evaluations of quality to actual quality and found that parents do not use all the available information to form their assessments. Mocan (2002) indicates that although parents value quality, they have difficulty assessing the quality of the child care they are purchasing. If parents cannot distinguish between high-quality and low-quality services, the demand for quality is curtailed. Blau and Mocan (1999 and 2002) found that on average U.S. parents of young children are unwilling to spend significantly more on formal care in order to obtain higher quality care.

Many of the elements of structural quality, such as higher staff ratios, cost more to provide. Therefore there may be a relationship between cost and structural quality in child care. Process quality, however, may not be as directly related to costs. Therefore, there may or may not be an overall relationship between ECEC quality as defined above, and the price charged for the service.

Blau's (2001) U.S. study found that the relationship between price and quality of child care is relatively weak and highly variable. A positive relationship between price and quality appears in three of the four states he examined using state level data. This observed relationship, however, might be spurious because the relationship vanishes in most cases when smaller geographic areas are examined such as towns, counties and zip codes. A few local markets show a strong relationship between price and quality, but most do not. As indicated by Blau, the market relationship between price and quality is determined by the cost of extra quality (such as hiring more ECE-trained workers) and by consumers' willingness to pay for quality. Since the relationship between cost and quality is likely to be similar across geographic locations, his results suggest that consumers' willingness to pay for higher quality is itself weak and highly variable across markets. In Blau's view this result may be because parents do not value child care quality in the terms defined by developmental psychologists or that parents simply may not have enough information to assess the quality of a child care provider.

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[13] Blau and Currie's (2004) U.S. study.

[14] Chevalier et al.'s (2006) Irish study.

The parents of young children might suffer from information asymmetry, which is mostly exhibited when parents interpret the signals of quality incorrectly, for example, equating clean reception areas with high quality ECEC. Furthermore, Mocan's (2001) U.S. study finds some evidence of moral hazard[15] where the centres with clean reception areas tend to produce a lower level of quality for unobservable items. These results provide a partial explanation as to why the private market might result in low average child care quality.[16]

Asymmetric information in this instance can be described as a market failure. Canadian researchers Cleveland and Krashinsky (1998) discuss various market failures, including those caused by parents' lack of information on quality, educational benefits, and future earnings. They also discuss the impact of market failure from credit market constraints that prevent people borrowing against future earnings. According to Cleveland and Krashinsky, some implications of these market failures in the sector, are that child care services are under-utilized. The underutilization of child care services is particularly acute for higher quality child care, while lower quality services are over-utilized. Furthermore, given that child care is shown to provide both general social benefits and private benefits to the parents and children—see the **Literature Review of Socioeconomic Effects and Net Benefits** for details—then the market will result in less child care being used than is socially optimal.

Hotz and Kilburn's (1994) U.S. study found some indirect evidence of information imperfections: holding the price of care constant, more stringent quality regulations are associated with an increase in the demand for non-parental care. They interpret this finding as evidence that increased standards provide a higher degree of quality assurance and hence parents demand more non-parental care.

Hofferth and Wissoker's (1992) U.S. study found that the effect of changing child-staff ratios on the demand for centre-based care is weak and inconsistent. Parents do not seem to respond to child-staff ratios—one of the more easily observed measures of structural quality. Using U.K. data, Parera-Nicolau and Mumford (2005) found a positive effect of the price of ECEC on labour supply when they included time constraints on the parents and children. They interpret this positive effect as an indication of quality—that is, a higher price indicates a higher quality of child care, which will lead to higher demand. As a result, if more quality is offered, labour supply is expected to increase.[17]

Hagy's (1998) U.S. study used a hedonic approach to estimate the demand for child care quality. She used this price as an explanatory variable in a demand equation for this quality attribute. Of the economic variables in the model, only the mother's wage rate is a significant predictor of the demand for staff-child ratio across all types of arrangements. The strongest determinants are the age of the youngest child, the presence of siblings in various age groups and the availability of a relative in the area. These variables are also the most significant predictors of the household's choice of child care arrangement. This study adds to a growing body of literature that suggests that consumers do not have a strong willingness to pay for quality as measured by regulated attributes, such as staff-child ratios.

Duncan, Paull and Taylor's (2001) U.K. study found that the unit value of child care purchased tends to decline with an increase in the number of hours of care for all types of formal care. This may be because lower quality is being chosen at higher hours of care. This is similar to the finding of Ribar's (1995) U.S. study, which found that child care expenditures increase with hours of work, but at a decreasing rate.

Duncan, Paull and Taylor (2001) also indicate that the choice of quality of care is dependent upon mothers' age and education, ethnicity, the number of preschool and young school siblings, mothers' earnings and other family income. Paull and Taylor's (2002) U.K. study found that the child-staff ratio is not significant for the employment decision of

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[15] Moral hazard is the situation in which one party in a transaction has more information than another and uses that information advantage for economic gain at the expense of the other party. Moral hazard can only exist if there is asymmetry information.

[16] Chevalier et al. (2006).

[17] Kalb's (2007) Australian study.

British mothers. This finding might relate to quality issues, but it is also possible that in the U.K. parents do not have a choice regarding the quality of child care due to its low availability.

Not all researchers agree that availability is the cause of low quality care. In the view of Blau and Hagy's (1998) U.S. study, it is implausible that child care supply restrictions prevent parents from following their preferences, so observed outcomes are not the optimal outcomes from the point of view of parents, given the number of centres with a wide range of attributes in each parent's area. Instead they argue that their results suggest that parents do not value child care quality highly, but suggest there is evidence that parents care about some unobserved features of child care.[18]

Not all types of child care provide the same level of quality. The sociology and psychology literature points to the advantage of preschoolers attending centre-based care over alternative arrangements (Berk, 1985 [U.S.], Howes, 1983 [U.S.], Ruopp et al., 1979 [U.S.]). Centre-based care allows children the opportunity to interact with peers, and typically exposes children to a variety of learning experiences that are beneficial for early childhood development.[19]

Government Policy and Quality

Market failure is a general reason for governments to intervene in the marketplace to achieve a more socially optimal level of consumption. Government policies that affect the demand for ECEC were discussed earlier. Government policies can, for example, directly influence the structural quality of ECEC by changing regulations for child-staff ratios, educational requirements of staff and group sizes. In Canada, there are government policies in all jurisdictions that focus on quality. These include various types of operating grants, wage subsidies, and training grants paid directly to centres rather than parents. However, most of the research in this area tends to focus on government policies that will encourage an increase in the quantity of ECEC used, and mothers' labour force participation—not on the implications for quality. There is also disagreement in the literature as to what should be done to boost quality.

Chevalier et al.'s (2006) Irish study suggests an inherent trade-off between boosting quantity and quality of child care. In their view, child care subsidies can be designed either to encourage employment or enhance quality care. Policies that encourage employment would allow parents flexibility in choice of quality of child care, and policies that are most likely to encourage the use of high-quality services would not impose employment requirements. Blau (2001) believes that the main problem with the child care market in the U.S. is low quality. Hence child care subsidies with an employment prerequisite are likely to worsen the problem by increasing the use of low quality care. He argues for subsidies tied to the level of quality. U.S. researcher Hagy (1998), however, suggests that tied subsidies have almost no influence on the demand for quality.

Duncan, Paull and Taylor's (2001) U.K. study found that price has a negative impact on the decision of working mothers to use formal paid care and the hours they purchase. In addition, their evidence suggests that price is negatively related to the quality of services purchased. In their view, price subsidies could potentially increase child care expenditures both by increasing the quantity demanded and raising the level of quality purchased.

As discussed earlier, one of the market failures in the ECEC sector seems to be related to asymmetric information, which results in lower quality ECEC being used than what parents' want and is socially optimal. To address this one strategy would be for governments to make information publicly available about the quality level of services offered by different providers. In this way, parents could more easily include quality in their decision-making process and providers could compete on the basis of quality. According to a government representative, one provincial government that makes information available from the Early Childhood Environment Rating Scale (ECERS) ratings of child care centres has seen some notable results. Parents'have started shifting their children to centres with higher quality ratings, centres have responded by trying to retain trained workers through higher wages, and lower quality centres have tried to improve the training of their workforce.

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[18] Kalb (2007).

[19] Chiswick and Burman's (2004) U.S. study.

Section 1C: Labour Mobility

Labour mobility reflects movement between regions, occupations and different labour market states—employment, unemployment, and not in the labour force. There are many similarities between the reasons for occupational and geographic mobility, and some researchers suggest that job seekers consider both together. While most of the economic literature tends to examine one of these aspects of labour mobility, both share many similar underlying theories and empirical results.

Occupational and Geographical Mobility

The economic literature provides a number of competing models for occupational mobility,[20] but is not clear on whether one model is superior to the others. There is evidence to support at least some aspects of each approach. One of the most pertinent aspects of the empirical literature is that there is a fairly consistent list of factors that affect occupational mobility: the financial and non-financial costs of changing occupation, age, formal education, training, gender and perhaps ethnicity. The literature also indicates that there are likely substitution effects and crowding out of less qualified employees by more qualified employees at least when labour demand is reduced, and a substitution toward less qualified employees when demand is strong. Some of these effects could happen on a continuing basis and could lead to a persistent mismatch between needed job skills and qualifications of employees.

The economic literature hypothesizes that part of the reason for the occupational mismatch is that jobs are location-specific, and there could be financial or non-financial barriers that prevent workers from moving to where the jobs are located. Thus the spatial element must be considered when trying to model occupational demand, supply and workforce shortages. Even at the provincial/territorial level the geographic size might be too large.

Most research on geographic mobility assumes that people will move when the discounted flow of monetary and non-monetary benefits of moving exceeds the costs. The real question then becomes, "What are the benefits and costs that influence geographic mobility?". The dominant **financial factors** that the literature points to include:
- wage differences;
- the probability of being employed (unemployed) in the new region;
- government income support payments;
- cost-of-living differences (particularly for housing); and
- the financial costs of the move, which tend to increase with distance.

The literature also points to a long list of possible **non-financial factors** affecting geographic mobility, including:
- social networks;
- psychological costs; and
- location-specific human capital.

Since many of these non-financial factors are unobservable, the personal characteristics of migrants are used as proxies. **Personal characteristics** that are linked to geographic mobility include: age, formal education, occupation, income level, gender and perhaps ethnicity.

Another line of economic research has changed the focus from the benefits of geographic mobility to the benefits of immobility. Many of these factors can be thought of as the costs of moving, and some of these arguments are replicated in the literature on geographic mobility. Fischer and Straubhaar's (1996) Scandinavian study was among the first to present some hypotheses on the "value of immobility" in a systematic way. They argue that some of the abilities and assets of every human being are location-specific and not transferable to other places. Since these skills and abilities are obtained through a process that requires time and effort, migration turns such efforts into lost "sunk costs". Furthermore,

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[20] See Fairholm and Somerville (2005) for a detailed discussion of the models of occupational mobility. There are a number of competing models that explain occupational mobility from a theoretical perspective, including: human capital, signalling, job search, job competition, job matching, and segmentation.

immobility permits the accumulation of location-specific advantages. These "insider" advantages are not only economic, but also cultural, linguistic, social and political. Location-specific advantages may explain why most people stay immobile even when considerable national and regional disparities continue to persist.[21] Labour immobility also alters the economic incentives of employer provided training.

A key factor that influences immobility is housing. The housing market is often regulated and non-transparent. Leaving—and thus being forced to sell one's property at a certain time and buy or rent a new dwelling in another location—often significantly reduces prospective gains from mobility. A considerable amount of research has shown that housing costs and lack of available housing in the host region can inhibit migration. Similarly, in the housing literature some studies show that in areas that have rent controls (and therefore rental housing shortages) potential migrants may decline a job because they cannot find anywhere to live, or cannot afford the new residence compared to their rent-controlled apartment. In the U.K., it has been suggested that the structure of housing tenure has restricted the geographical mobility of workers (Hughes and McCormick, 1981, Cameron and Muellbauer, 1998, Henley, 1998, Gardner et al., 2001).

Training and Turnover

Demand for the number of workers (or worker hours) because of an increase in ECEC services is known as expansion demand. This demand represents a relatively minor portion of the total demand for workers by the sector. Most of the need for workers is because people leave their jobs (known as turnover[22] or separations[23], and related to replacement demand). Workers leave their jobs for a variety of reasons, such as retirement, maternity leave, other family reasons, going back to school and finding a job outside of the sector.

Many of the reasons for voluntarily job separations tend to be age-related. For example, older workers have a greater tendency to leave employment because of retirement or illness, while younger workers have a higher separation rate for maternity leave or going back to school. Therefore, the age profile of the workforce will have an impact on the turnover rate.

From the perspective of the economic literature, any job separation decision hinges on the worker's wage relative to alternative opportunities and the contribution she makes to her enterprise (or in formal economic terms "the marginal product") relative to her real wage. If a worker's contribution to the enterprise is above her wage, then the worker will benefit by taking a job with another employer who is willing to pay according to her value. Similarly, if a worker is paid more than her value to the enterprise, the employer has an economic incentive to fire or lay off the worker. The labour market dynamics of the sector will be examined in more detail below.

In the standard human capital approach to labour mobility, if existing workers receive training, the higher level of human capital will raise their value to an employer, which should increase their wages.[24] If their wages do not rise, then they have an incentive to move to another job. Becker's (1962) U.S. study distinguishes between general training and job-specific training. Training that is general and raises a worker's value to other employers will tend to raise labour mobility and turnover. If training is job-specific and not applicable to other employers, then the firm will benefit, but there will not be any incentive for the worker to move, since another employer will not gain any additional benefit.

In a study that examined the link between the acquisition of different types of training and occupational mobility, Dolton and Kidd's (1998) U.K. study concluded that the type of training has a bearing on career mobility with a clear distinction between job changes and occupation changes. Their results suggest that a person's tenure in the same firm (either with or

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[21] See Tassinopoulos and Werner's (1999) EU study for a more thorough discussion of space-specific advantages and society-specific advantages that comprise location-specific advantages.

[22] The turnover rate reflects the number of people who leave their job in a given year relative to the number employed.

[23] Separations can be from an individual employer, a sector or from the labour force.

[24] Training is defined in many ways in the literature from formal education to employer provided classroom training, to on-the-job training, etc.

without promotion) is related to higher investment in firm-based training, whereas investment in occupation-specific or more general training tends to be related to job or occupation mobility.[25]

In contrast, there are many researchers who assume labour markets are imperfect and both employers and employees benefit when an employee receives training. These researchers show that some transferable training would be paid by employers (U.K. researcher Stevens, 1994). In a study that looked at the impact of training on mobility using individual and firm-level data in Britain, Green et al. (2000) found that training on average has no impact on mobility, but that training wholly sponsored by the worker is likely to be a prelude to a job search.[26] This finding suggests that firm-sponsored training allows the accumulation of firm-specific human capital, while off-the-job training allows the accumulation of more general human capital. In a study on local labour markets in Britain, Elias (1994) finds that women who received employer-provided and job-related training had a lower probability of changing employer or to transition to non-employment, but for men training made no significant difference to this type of turnover.

Neal's (1999) U.S. study found evidence that the tendency for sectoral change decreases with industry experience. U.S. studies by Neal (1999), Bils (1985) and McLaughlin and Bils (2001) found that more able workers change jobs less often. This is because they would experience a higher loss of job-specific skills by switching to another employer since not all of their skills are transferable. Shaw's (1984) U.S. study investigates mobility between occupations and finds that sectoral skills are only partly transferable with sectoral change, which means that there is some loss in human capital from occupational change, and this would reduce occupational mobility. Shaw's (1987) U.S. study examined how occupational change is associated with the intensity of occupational investment and the transferability of occupational skills. She estimates that a 25% increase in the transferability of occupational skills leads to an 11%-23% increase in the rate of occupational change.

Turnover in Canadian ECEC

Turnover rates in the Canadian ECEC sector are higher than general turnover rates in the labour market. The ECEC worker turnover rates by province and teacher position recorded by Doherty et al. (2000) are listed in Table 1. Turnover rates were highest in Alberta (45%) and lowest in PEI (15%). Some of this turnover reflects people moving from one employer to another within the broader ECEC sector, but many people also leave the field altogether. Turnover generally decreases with seniority.

Not only does workforce turnover impose recruitment challenges, it can also decrease the quality of care that children receive (Whitebook et al., 1998 [U.S.]). Higher wages have been shown to decrease turnover (Park-Jadotte et al., 2002 [U.S.]). A number of provinces have directly or indirectly instituted wage subsidies for workers in the sector in recent years, which should help to lower turnover rates. However, the overall unemployment rate has declined to multi-decade lows throughout Canada, which implies general workforce shortages. This means that employers in other sectors might recruit ECEC workers with higher wages and benefits than offered by the ECEC sector. It is therefore unclear if the recent ECEC worker wage gains will be sufficient to lower the turnover rate in the occupation, since the data in Table 3 were collected during a strong demand for educated workers from other sectors.

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[25] Shah and Burke Australian study (2003a) p. 8.

[26] Shah and Burke (2003a) p. 6.

Table 1: Teaching Staff Turnover Rates, by Position and Jurisdiction, 1998				
Jurisdiction	Assistant (%)	Teacher (%)	Supervisor (%)	All Positions (%)
BC	26.6	27.0	17.7	23.7
AB	74.4	40.1	27.2	44.8
SK	44.6	27	39.4	32.2
MB	18.7	19	9.9	17.3
ON	16.5	19.1	10.1	16.7
QC	23.5	17.8	14.2	17.4
NB	34.9	23.7	15.8	26.1
NS	24.9	27.5	7.2	22.3
PE	0	21.7	7.4	15
NL	53.4	17.7	13.5	23.7
Canada	**28.2**	**21.9**	**15.5**	**21.7**
Source: Doherty et al. (2000).				

As Decry-Schmitt and Todd's (1995) U.S. study states, not all turnover is bad. Both the field and children benefit when those who provide low-quality care choose to end their business. Organizational psychologists have suggested that from a practical standpoint, a profession should be most concerned about voluntary turnover among workers who are performing well in their jobs.

This view does not provide much comfort to the Canadian ECEC sector since much of its turnover is voluntary. According to the data in Table 2, about 38% of all job leavers quit voluntarily, which means that the sector suffers from high, mostly preventable, turnover. The percentage of voluntary quits was highest in Alberta and lowest in PEI.

To understand why workers leave child care, it is useful to examine what ECEC workers identify as the negative aspects of working in the sector. Doherty et al.'s (2000) *You Bet I Care* study examined these reasons (see Table 3) and found that the main one, cited by three-quarters of staff, is lack of pay and promotion opportunities.

Table 2: Reasons for Leaving, All Teaching Staff Combined, 1998							
Jurisdiction	Quit (%)	Fired (%)	Leave of Absence (%)	Laid Off : Low Enrolment (%)	Laid Off : Other (%)	Unknown (%)	Other (%)
BC	38.1	11.5	8.2	10.9	8.1	0.7	20.4
AB	53.2	18.9	4.5	3.5	0.0	1.4	11.1
SK	32.0	11.4	14.7	10.8	5.9	1.0	21.6
MB	47.8	10.4	11.6	3.4	6.1	0.7	19.9
ON	31.6	10.0	18.3	3.5	6.1	0.6	26.6
QC	27.1	13.7	10.5	2.3	9.9	1.7	33.0
NB	38.7	9.2	4.1	7.9	2.9	1.7	31.6
NS	41.9	10.8	3.6	13.3	6.9	0.0	17.6
PE	14.0	22.5	14.0	0.0	8.5	0.0	39.5
NL	23.9	0.0	12.0	5.7	12.0	0.0	24.5
Canada	**38.1**	**13.3**	**11.0**	**4.5**	**7.0**	**1.0**	**25.1**
Source: Doherty et al. (2000). Note the sample size for PEI was small so the figures may not be statistically valid.							

Other reasons deal mainly with working conditions and a perceived lack of respect for the field from the public and government officials.

Turnover rates for family child care agencies are harder to come by. As identified by Canadian researchers Doherty et al. (2001), a proxy for turnover—time that family workers have spent in agencies—shows that agency turnover rates are also high.

Unlike centre workers, voluntary turnover among agency workers is mostly caused by non-work-specific issues rather than issues related to compensation and working conditions. Turnover not only affects child care workers, but also child care facilities. Kershaw et al. (2004) examined over 2,500 licensed child care facilities in B.C. and found that 27.6% of the centres and 47.4% of the family child care that existed in 1997 were no longer in operation in 2001.

Table 3: The Most Frequently Cited Negative Aspects of Working in the ECEC		
Reasons Among Top Three Choices	Percent of Staff	Percent of Directors
Pay and promotion opportunities, e.g. low salary, lack of wage increases, benefits, paid overtime	75.5	73.5
Lack of respect, e.g. the public's perception of the status of child care staff	45.8	43.1
Working conditions, e.g. hours, staffing ratio, lack of supplies, finding qualified substitutes	32.4	26.7
Nature of the work, e.g. doing cleaning, lack of adult contact, little planning time, collecting fees	25	23.3
Dealings with society and government, e.g. the attitude of government officials	20.7	25.2
Source: Doherty et al. (2000).		

SECTION 2: SUPPLY OF EARLY CHILDHOOD EDUCATION AND CARE WORKERS

This section examines the supply of ECEC workers. Clearly, workers provide both education and care services to children, both of which are important for childhood development. For analytical purposes, however, the workforce is decomposed into component parts in order to more clearly understand the factors that influence various aspects of the supply of workers.

Worker supply is determined by the number of ECEC workers and the hours they work. The number of available ECEC workers depends on how many school leavers and migrants enter the workforce, the number of workers who choose to remain in the sector and those who return to ECEC. The quality of the service is influenced by the quality of ECEC workers. In addition, unions affect both the quality and supply of ECEC workers. Therefore the ECEC worker supply part of this analysis can be divided into the following sections:

1. Quantity of ECEC worker hours supplied
2. Quality of ECEC workers
3. ECEC workers' supply decisions
4. Unions' effect on ECEC worker supply

Section 2A: Quantity of Early Childhood Education and Care Worker Hours Supplied

Employment and weekly hours for salaried employees and those paid by the hour are available from the Survey of Employment Payrolls and Hours (SEPH) for those employed in the Child Day-Care Services Industry (NAICS 6244). These data are a proxy for those people employed in child care centres because the data are for all employees in the industry, excluding the self-employed.

The Labour Force Survey (LFS) has data for the number of people employed in the industry as well as data from the National Occupational Classification (NOC) of early childhood educators and assistants (NOC 4214 & NOC-S E217). These data are a proxy for those working in both child care centres and family child care.

The census has information on employment, labour force and educational qualifications. These data can be divided between those who work at home, and those who work at a usual place of work outside their home. The former are a proxy for those who work in family child care, while the latter are a proxy for those who work in child care centres.

Number of ECEC Workers

Tables 4 and 5 show that there has been a steady increase in the employment of ECEC workers over time. This growth has coincided with a steady shift towards hiring salaried employees rather than employees paid by the hour. Unfortunately, SEPH does not collect data on the total number of ECEC workers in the labour force. This means that there is some extra supply that can be realized by hiring unemployed ECEC workers. However, according to the LFS, this additional supply is not too significant due to very low unemployment rates for ECEC workers.

Table 4: Employees Paid by the Hour ('000s)								
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Canada	39179	43378	44908	44076	42108	39744	31752	48579
QC	12087	13926	15378	15723	15705	15283	11758	17741
ON	12907	14225	14460	13836	12855	12166	9844	15507
MB	2290	2627	2687	2536	2401	2238	1871	2788
SK	900	710	595	718	720	642	511	772
AB	4507	4491	4227	4005	3762	3450	2852	4110
BC	3923	4399	4673	4455	3989	3722	3015	4973
Source: Survey of Employment, Payrolls and Hours. *No data for Atlantic Provinces.								

Table 5: Salaried Employees ('000s)								
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Canada	25852	28337	30867	35399	40328	45768	57599	44289
QC	8565	9896	11218	13536	16126	18775	23085	17743
ON	9051	10166	10386	11365	12620	14263	18136	14418
MB	1216	1222	1327	1615	1791	2044	2633	1992
SK	519	523	670	635	741	815	1006	856
AB	2371	1997	2131	2533	2820	3132	4024	2802
BC	2867	3197	3550	3807	4146	4491	5882	4071
Source: Survey of Employment, Payrolls and Hours. *No data for Atlantic Provinces.								

As illustrated in Figure 1, the LFS indicates that the increase in the overall labour force has generally kept pace with the rise in employment from 2000 to 2007. The unemployment rate for ECEs and assistants fell by 0.8% from 3.8% in 2000 to 3.1% in 2007, the same change as for all occupations. The decline in the unemployment rate for the sector went from 3.7% to 3.3%. According to the census, the number of people with ECE qualifications employed elsewhere in the workforce and the number who dropped out of the labour force altogether is more significant than the number of currently unemployed ECEC workers. In 2006, only 35.7% of people who worked in the ECEC sector had the most common qualification of those in the sector (CIP 19.0709 Child Care Provider/Assistant at the college level). There were 41.2% of people with this qualification employed in other sectors, including the elementary school system. In comparison, only 3.8% of people with this qualification were unemployed, while 19.4% had dropped out of the labour force altogether.

**Figure 1: Labour Force Expanding Quickly With Employment
Growth from 2000 to 2007 (%)**
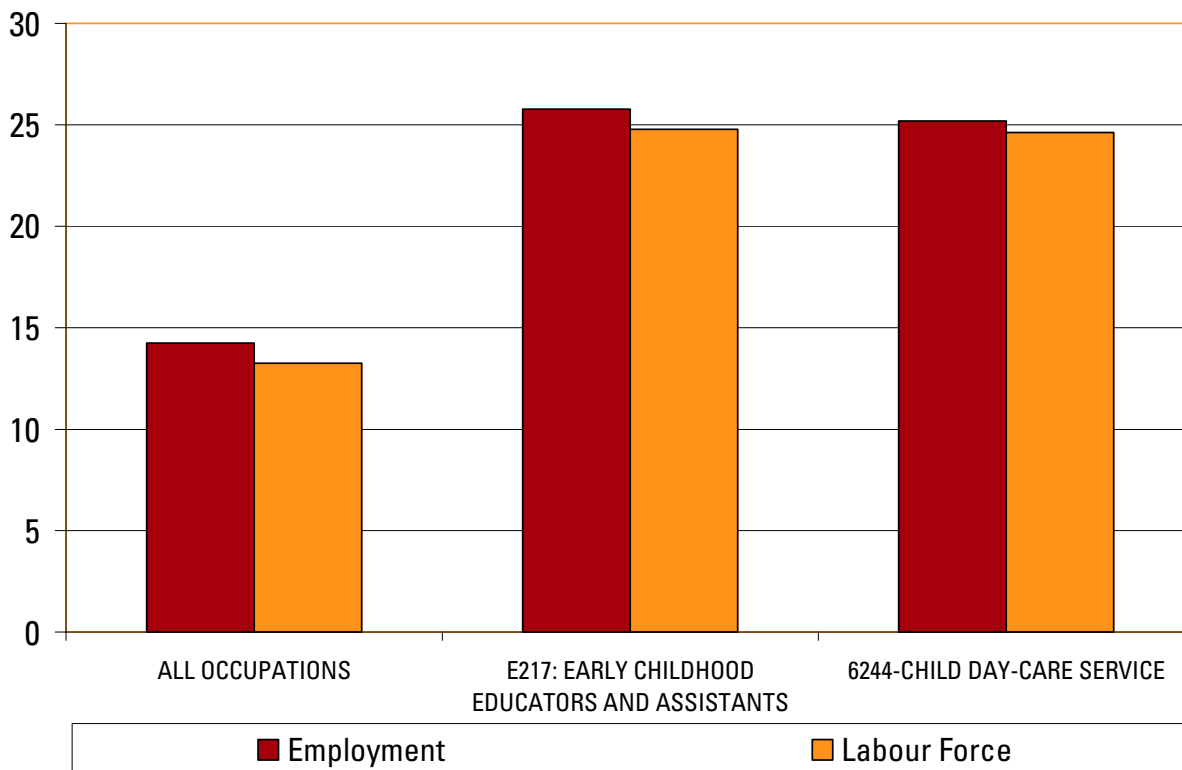
Information discussed below and key informant interviews suggest that the sector also faces a challenge encouraging students to select ECE-related postsecondary programs and accept employment in the sector. Some provinces have instituted programs to encourage enrolment that have reportedly worked, but unless those selecting ECE studies end up working in the sector this increase in enrolment will not have a meaningful impact on the number of available workers.

Hours Worked by ECEC Workers

Hourly paid ECEC employees worked less than 30 hours per week on average in 2007, and 14% below the industrial average. Therefore, it seems as though the current hourly paid ECEC workforce is underutilized and the number of hours of labour supply could be increased by bringing hourly paid workers up to the industrial average. Notably, though, salaried employees already work close to the industrial average and therefore there would be less scope to boost labour supply via this channel.

Since the elasticity of hours of ECEC labour supply is surprisingly responsive to wages, employers could encourage a large increase in the hours worked by ECEC workers via a small increase in wages. However, according to Miller and Ferguson's (2003) Canadian study, ECEC workers face increasing hours of unpaid work and in many cases are sent home without pay when enrolment is low. If ECEC providers supply more labour than what the official payroll figures suggest, and relatively more today than in the past, then the potential increase in hours worked might be less responsive than expected based upon the historic estimate of the elasticity of hours of labour supply with respect to wages.

Table 6: Weekly Hours for Employees Paid by the Hour								
	2000	2001	2002	2003	2004	2005	2006	2007
Canada	28.3	28.9	28.5	28.4	30.6	30.9	31.1	26.7
QC	28.9	31.7	32.8	31.6	34.3	34.9	37.2	31.5
ON	28.9	27.7	25.3	26.0	27.0	27.4	26.2	22.8
MB	24.4	24.8	25.3	24.6	27.6	27.2	23.7	22.2
SK	26.1	27.0	26.9	25.0	25.3	24.0	23.9	19.6
AB	25.7	25.3	25.3	25.5	27.4	28.8	29.6	27.1
BC	28.9	29.1	27.7	29.2	32.5	32.2	32.5	26.4

Source: Survey of Employment, Payrolls and Hours.
*No data for Atlantic Provinces.

Table 7: Weekly Hours for Salaried Employees								
	2000	2001	2002	2003	2004	2005	2006	2007
Canada	37.2	38.8	38.0	38.1	37.8	38.9	42.2	36.5
QC	34.6	37.5	36.7	37.6	37.7	39.8	43.3	36.6
ON	39.8	38.0	37.5	37.3	36.6	37.7	41.6	36.6
MB	32.4	35.9	34.8	33.8	30.9	32.4	34.3	32.5
SK	34.9	42.2	41.3	36.8	36.2	35.6	36.9	31.3
AB	32.7	38.7	38.1	35.7	37.0	37.6	40.2	36.9
BC	43.2	42.3	40.8	45.0	44.8	45.4	49.7	39.9

Source: Survey of Employment, Payrolls and Hours. *No data for Atlantic Provinces.

Section 2B: Quality of Early Childhood Education and Care Workers

ECEC worker education is closely associated with quality of ECEC services, yet there is still scope for improvements in the education of Canadian ECEC workers.

Quality Effects of an Educated Workforce

Several researchers have reported that more ECE-educated providers offer higher quality care based on indices of caregiver behaviour, (Clarke-Stewart et al., 1994 [U.S.]; Kontos et al., 1995 [U.S.]; Rosenthal, 1994 [Israel]; and Stallings,1980 [U.S.]) and global quality scores (Burchinal et al., 2002 [U.S.]; and Goelman, 1988 [Canada]; Friendly, Beach and Doherty, 2005 [Canada]). In a substantial number of studies, it has been reported that care providers with specialized training in child care or child development provide better quality care on global scales (Burchinal et al., 2002 [U.S.]) and do more teaching (Bollin, 1990 [U.S.]; Clarke-Stewart et al., 1994 [U.S.]; Fischer and Eheart, 1991 [U.S.]; Fosburg, 1981 [U.S.]; Kontos et al., 1995 [U.S.]; Kontos et al., 1996 [U.S.]; Howes, 1983 [U.S.]; Howes et al., 1988 [U.S.]). But these findings have not been replicated in all studies (Kontos, 1994 [U.S.]; and Rosenthal, (1994) [Israel]).[27]

These results suggest that the demand for ECEC-educated workers should be more closely associated with the demand for quality and early childhood education, while less educated ECEC workers should be more closely associated with the demand for early childhood care. However, as discussed previously, asymmetric information could drive a wedge between parents' demand for quality ECEC and the supply of quality ECEC by employers. So it is not clear that rising demand for quality will translate directly into higher demand for more ECE-educated workers versus less highly trained workers.

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[27] Clarke-Stewart et al.'s (2002) U.S. study.

The demand for early childhood educators is also influenced by government regulations. These regulations have a clear impact on the number of ECEC workers and the training of workers who are hired. Government regulations also have an impact on the quality of ECEC services. Clarke-Stewart et al.'s (2002) U.S. study found that certain features of ECEC that are regulated are related to observed quality of care. For example, caregivers who were better educated and had received more recent and higher levels of training structured richer learning environments and provided warmer and more sensitive caregiving. And when settings were in compliance with recommended group size, caregivers provided more positive caregiving. Furthermore, children with more educated and trained caregivers performed better on tests of cognitive and language development. As well, children who received higher quality care in homes that were more stimulating, with caregivers who were more attentive, responsive, and emotionally supportive, did better on tests of language and cognitive development and were rated as being more cooperative. There was no difference in associations with child outcomes for children from higher or lower income families. The researchers state that their findings make a case for the importance of promoting caregivers' education and training and requiring that family child care not exceed the recommended age-weighted group size.[28]

Education of the Current Canadian Workforce

According to the 2006 census, the ECEC labour force seems relatively well-educated with around two-thirds of the workforce having a postsecondary credential and only about one-tenth of the workers having less than a high school diploma (see Figure 2). However, only around one-third of the ECEC workforce has a postsecondary credential related to early childhood education. Therefore, there is room for improving the quality of the ECEC workforce.

Different provinces have different educational requirements for ECEC workers and there have been instances where centres have sought exemptions to these restrictions. For example, in Manitoba in 2001, 39% of child care centres had an exemption from staff education restrictions due to problems with recruiting enough qualified staff (Mayer, 2001).

Section 2C: Early Childhood Education and Care Workers' Supply Decisions

The current and future supply of ECEC workers is severely curtailed when workers in the sector decide to pursue alternative employment. In order to minimize the exodus of ECEC workers, it is important to identify which groups of ECEC workers are most likely to stay in the field.

According to Canadian researchers Doherty et al. (2000) at least a quarter of ECEC workers who left their jobs also left the sector altogether. Since only around 13% of those who left the sector were fired, most of the workers choosing jobs outside of ECEC are qualified and competent to work in the field. These observations are corroborated by the 2006 Census, which shows that roughly half of the people who have the most common postsecondary credential possessed by those working in the ECEC sector (NAICS 6244), do not work as early childhood educators and assistants, but are employed in other occupations. This suggests they have either left the occupation or never entered despite having the needed credential.

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[28] Clarke-Stewart et al. (2002).

Figure 2: Education of ECEC Sector Workers

Qualifications of Employed ECE's and Assistants in Child Care Industry (%)
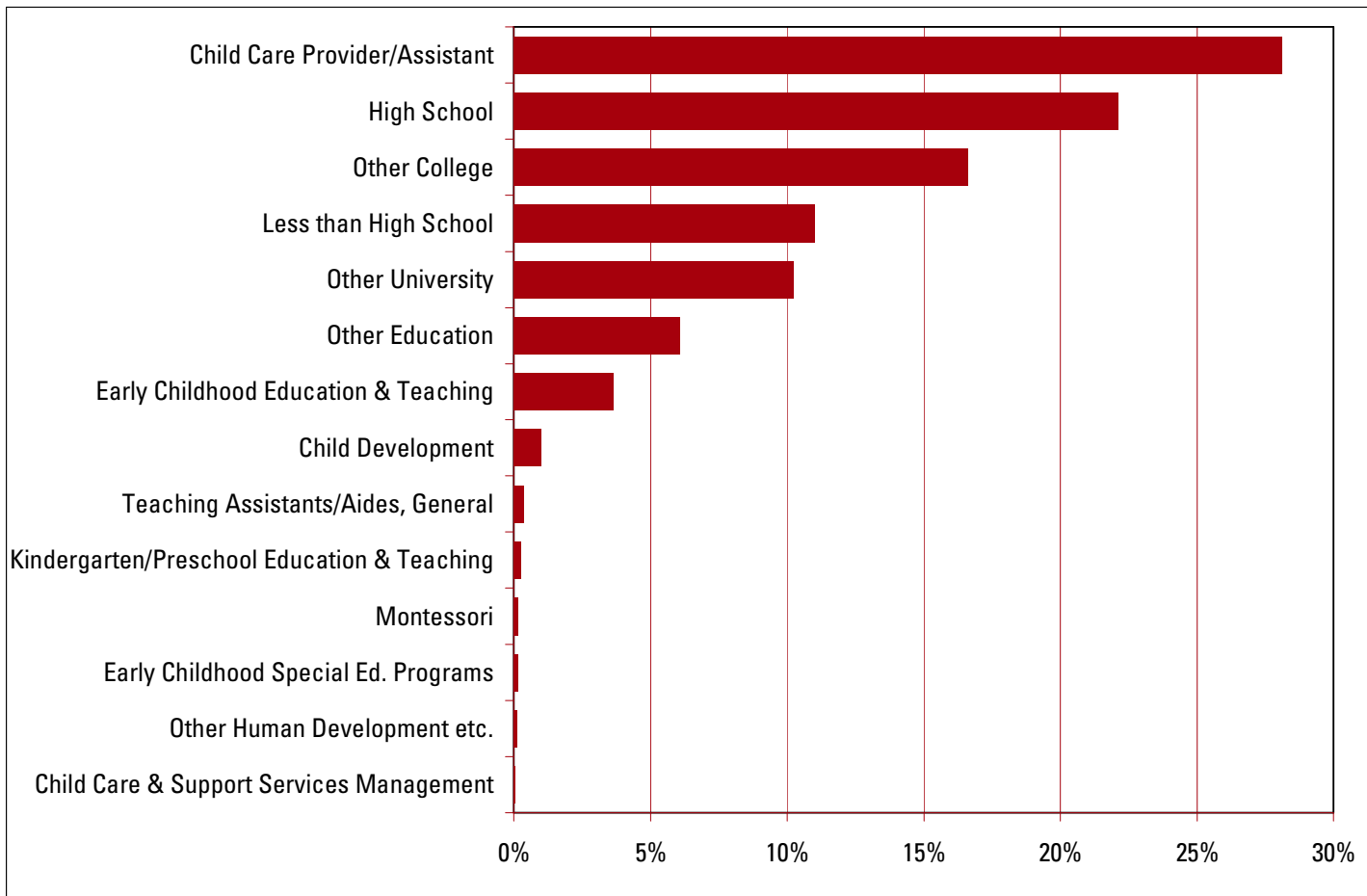
These tendencies might be even more acute for younger workers. Doherty et al. find that a higher proportion of junior/younger workers choose to leave the sector altogether than workers in general and an analysis of the labour force survey and census data that is discussed in the report **Recruitment and Retention Challenges and Strategies** suggests there is a much higher rate of labour market churning (inflows and outflows) in this age cohort than other age cohorts in the sector or for those of this age cohort for all occupations as a whole.

An indication that these trends will persist comes from a study of Canadian early childhood education students where 48% of the student survey participants saw themselves working in regulated ECEC upon graduation, and only 25% in five years (Beach and Flanagan, 2007). According to Doherty et al. (2001), intentions to leave are also quite high among workers in Canadian family child care agencies.

To reduce the need to replace workers, it is important to identify which groups are likely to stay at the job. Rolfe's (2005) U.K. study mentions that males and older workers are less likely to leave jobs in ECEC. There is evidence that centres are improving their recruitment of older workers—census data show that the proportion of the ECEC labour force aged 35 years or older rose from 44.6% to 53.1% between 1991 and 2001, and to 56.7% by 2006 for a 12.1% increase over the decade, while those aged 35 years and over for all occupations rose from 58.5% to 64.0% an increase of 5.5%. Notably, if the existing number of people in the labour force in 1996 were "aged" ten years, the implied recruitment of new workers to account for the total number of people in the labour force by 2006 for older cohorts were much larger for the ECEC sector than for all occupations in general. A difference estimated to represent 37% of those in

the ECEC labour force by 2006. While there are more older wokers, the ECEC workforce is still overwhelmingly female. Rolfe (2005) has attributed this to several factors:

- low pay seen as inadequate to support a family;
- the image of ECEC as "women's work"(this was also thought to discourage men; particularly boys at school considering their career options); and
- concerns by employers and society about employing men in ECEC.

Section 2D: Unions

A union can be defined as an association of suppliers of a particular type of labour formed to raise wages and improve working conditions. To be successful, the union, like any would-be monopolist, must be able to control the supply of labour offered to firms.[29] If the union is operating in an otherwise perfectly competitive market, then restricting labour supply in order to increase wages results in a reduction in the demand for child care workers. To pay for the higher labour costs would require an increase in subsidies or an increase in fees. And a fee increase would directly lower the demand for ECEC services and therefore the total demand for ECEC workers.

As discussed by Cleveland and Hyatt's (2000) Canadian study, unionization of workers elsewhere in the economy typically causes wages to be raised above those of non-unionized workers; the typical union premium is approximately 10% to 15%. If unionization enhances productivity, they expect to see a wage premium paid to unionized child care workers (all other factors held constant), even in a competitive market. If there is some local monopoly power in ECEC markets that have important spatial characteristics, unionization may be associated with a significant wage premium. Cleveland and Hyatt argue that if the ECEC labour market is perfectly competitive and unionization does not enhance productivity, no union premium should be observed. Their results indicate that union status is, independently, an important determinant of ECEC worker wages; being a union member has a statistically significant positive effect (+17%) on the average hourly wage.

A recent Canadian example of unions influencing ECEC wages was a strike in Quebec over low wages. The strike ended in 2000 with an agreement to increase ECEC workers' wages by 35%-40% over four years.[30] However, according to the SEPH tables on hourly wages for salaried employees and employees paid by the hour, the strike merely put Quebec ECEC wages on par with those of the rest of Canada. Furthermore, since the Quebec system provides government funding to support ECEC services at a subsidized rate, the wage increase would not have had a significant negative effect on ECEC worker demand, but would have had an impact on the overall size of the government subsidy.

Unions have also been shown to increase measures associated with ECEC quality. According to Doherty and Forer's (2002) Canadian study:

> In comparison with non-unionized centres, unionized centres hire a lower proportion of untrained teaching staff and a higher proportion of staff with two years or more of ECCE education, pay higher salaries, are more likely to provide in-service education, expect workers to be responsible for a slightly lower number of children, and more often act as field training sites for ECCE students.

This means that unions resulted in centres using more workers per child care space and better qualified workers. Unionization is also associated with lower staff turnover. Notably, all of these influences will help to improve the quality of ECEC services provided.

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[29] Gravelle and Rees (1981) p. 387.

[30] CCHRSC's (undated) Canadian study.

Table 8: Hourly Wages for Salaried Employees								
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Canada	12.82	13.67	14.51	15.72	17.04	16.7	15.77	17.3
QC	12.03	13.15	14.4	15.15	16.64	16.54	15.48	17.97
ON	13.74	15.38	16.01	18.07	19.61	18	17.22	15.62
MB	12.43	13.33	13.86	14.4	17.59	19.55	16.74	18.17
SK	13.35	12.13	12.33	15.03	15.62	16.19	18.1	22.12
AB	12.77	13.12	13.94	15.6	16.03	16.92	16.24	19.71
BC	12.18	11.89	12.72	12.3	13.29	13.05	11.81	16.35
Source: Survey of Employment, Payrolls and Hours.								

Since parents value higher quality but are often unable to identify better quality care, it is feasible that unionized workforce can act as a signal of better quality ECEC, due to greater continuity and higher education of staff. If the unionization of the child care centre therefore increases demand because of the signal that higher quality care is offered this effect would act to offset the potential negative impact on demand from higher costs and therefore fees. This means that the unionization of a workforce will have potentially ambiguous implications for the demand and supply of ECEC services and the ECEC employment.

Table 9: Hourly Wages for Employees Paid by the Hour								
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Canada	11.62	11.2	11.89	12.42	12.91	10.94	10.51	12.94
QC	9.81	9.22	9.65	10.5	11.09	9.66	8.66	10.64
ON	13.01	12.74	14.32	15	15.96	12.67	13.35	15.29
MB	11.45	11.77	11.88	11.66	12.14	12.07	11.91	13.68
SK	11.82	11.59	11.4	12.57	13.32	11.99	13.18	16.73
AB	11.58	11.86	12.21	12.2	12.57	10.75	10.28	13.76
BC	12.73	12.35	13.84	13.44	13.59	11.48	10.52	14.84
Source: Survey of Employment, Payrolls and Hours.								

SECTION 3: EARLY CHILDHOOD EDUCATION AND CARE WORKER WAGES

This section discusses two major conundrums of the ECEC labour market: Why are wages in the sector so low, and why have they not recently increased? The analysis concludes with a discussion of the influence of employer characteristics on wages.

Section 3A: Conundrum 1: Why Is Early Childhood Education and Care Worker Pay So Low?

One of the conundrums of the ECEC labour market is the low pay of the workers considering their level of education. Census data for full-year, full-time workers in the early childhood educators and assistants (NOC 4214 & NOC-S E217) occupation are shown in Figure 3. As shown in the figure, those with a certificate or diploma earned on average $24,900 per annum or roughly 55% of the level of earnings of workers in all occupations. ECEC workers with a BA earned on average $31,200 or roughly 46% of the earnings of all workers with that qualification level.

If the market were perfectly competitive, then a workers wages should reflect their value to their employers. If the ECEC market is not perfectly competitive then ECEC workers' wages can persistently deviate from the value of their work to their employers. It is therefore useful to review the causes and consequences of imperfect competition.

There is a vast amount of literature on imperfect competition (e.g. monopoly or monopsony, oligopoly or oligopsony, and monopolistic or monopsonistic competition).[31] Basic microeconomics indicates that the higher the degree of monopoly power, the lower the output and wage compared with the competitive outcome. If a firm is both a monopolist and a monopsonist the output and wage are lower than under the conditions of either a monopoly or monopsony alone.

Recent advances in economic theory have extended the analysis of monopsony beyond single employer markets to include monopsonistic competition. Current monopsony models start from the position that one or more of the assumptions of perfect competition do not hold. In search models like Burdett and Mortensen (1998), the absence of perfect information on alternative jobs is one reason for imperfect competition. If workers must spend time searching for a new job, then a cut in wages will not result in employees immediately quitting their jobs. At the extreme, some employees may tolerate a lower wage indefinitely because they are unaware of better paying options.

Also, it may be costly for workers to move between employers. Moving or commuting expenses are the most common example of these costs. However, the perceived risk in taking a new job can also raise the cost of a change. For instance if the worker is moving from one occupation to another occupation there could be a concern that their skills are not a perfect fit for the new occupation and therefore there would be an increased risk of being fired. The result is that workers will accept a gap between their current wages and alternative employment that fails to cover both the real and perceived costs of switching jobs.

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[31] Monopsony is when there is only one buyer in the market. Monopoly is when there is a single seller of a product. Oligopoly and oligopsony refer to markets in which there are a few sellers or buyers, each of whom exercises some market power. Monopolistic competition means each seller of a group of close substitutes has some degree of monopoly power because of product differentiation or locational factors.

Figure 3: Relative Real Earnings
**Full Year, Full Time, % of All Occupations**
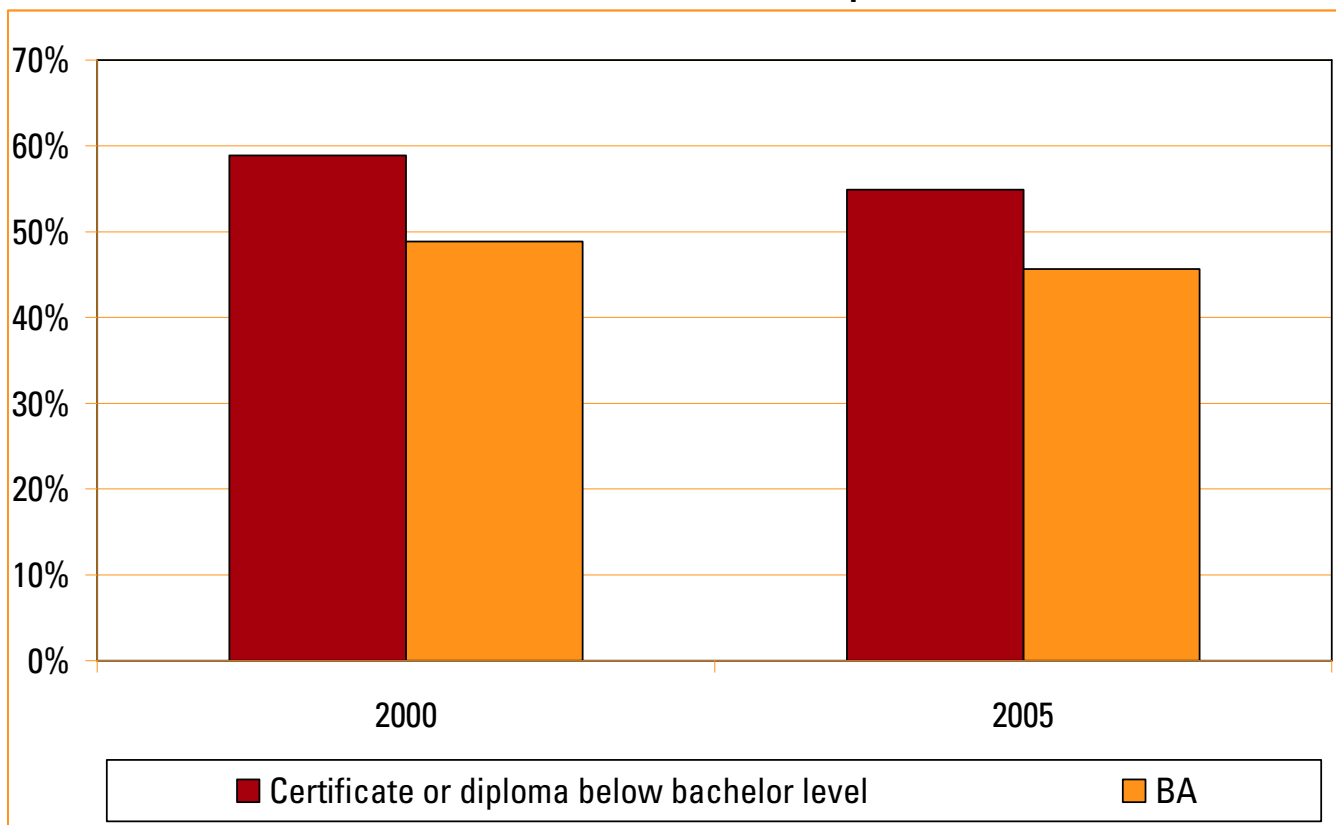
Bhaskar et al.'s (2004) U.S. and U.K. study notes that workers may have different preferences for different jobs. For example, the worker prefers the kind of work or non-wage working conditions in one job over another. The worker may stick with the "preferred" job even if wages are lower. This is relevant for the ECEC workforce. Don Gallant and Associates' (2007) study on Newfoundland and Labrador found that ECE students are generally people who have a passion for working with children. And Mocan and Tekin's (2000) U.S. study finds evidence of labour donation hypothesis in the child care sector. In other words, ECEC workers derive non-monetary benefit from working in child care because they believe their work is important to society. They feel that someone has to do it, even if for low pay.[32] Workers are essentially donating the difference in the wage they could earn in another job and the one they are being paid in child care to the employer because they believe in the importance of child care.

Cleveland and Hyatt (2000) indicate that the low wage for child care workers may reflect discrimination, or other institutional factors that lower the wage rate amongst young, untrained, female workers. From the demand side, it may also reflect the tendency of many of child care's customers to believe that its purpose is essentially custodial, and that the worker need not have any special abilities. Another possible reason for the low level of pay might be related to market failure as discussed above. If parents have a hard time determining quality, and under utilize quality child care services there would be downward pressure on the wages of ECEC workers who provide quality ECEC services.

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[32] Chevalier et al.'s (2006) Irish study.

Figure 4: The Market for ECEC Labour
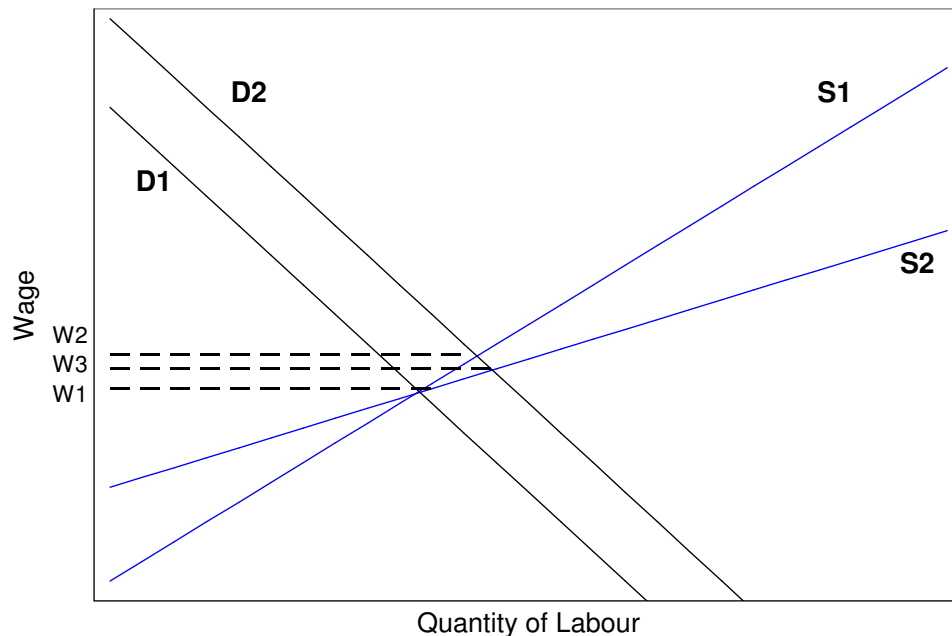
Section 3B: Conundrum 2: Why Have Worker Wages Not Increased Faster?

Another and related conundrum in the ECEC labour market is that the large increase in demand for services has not driven up the wages of workers in the sector. For example, according to the SEPH, total employment in the Child Day-Care Services industry (NAICS 6244) in Canada increased by 43% (or 5.2% on average) from 2000 to 2007, and employment of workers paid by the hour in the child care industry increased by 24% (or 3.1% on average) compared with an increase of 14.8% (or 2.0% on average) in total industrial employment. Similarly, the census shows that the population that earned employment income in the ECEC occupation (NOC 4214 & NOC-S E217) increased by 20.2% from 2000 to 2005 (or 3.8% on average) versus 10.9% (or 2.1% on average) for all occupations.

There is less agreement concerning income gains from these two data sources. The SEPH indicates that average weekly earnings (including overtime) for all employees in the ECEC sector rose by 25.3% (3.3% on average) from 2000 to 2007, while employees paid by the hour in the industry saw gains of 5.2% (0.7% on average). Over this period, weekly earnings for all industries increased by 2.3% on average and consumer price inflation increased by 2.3% on average. These data suggest that all employees in the ECEC industry saw real gains of 7.2% (1.0% on average), while workers paid by the hour saw a real decline of 10% (-1.5% on average). In comparison, the census data for 2006 and 2001 indicate that average real wages for the ECEC occupation (NOC-S E217) fell by 1.3% on average from 2000 to 2005, while average real wages for all occupations rose by 0.4%.

The data from the census for the ECEC occupation and industry data from the SEPH for workers paid by the hour suggest that the supply of ECEC labour is fairly elastic. As demand grows, the quantity of labour supplied expands along with it thereby moderating the tendency for the demand increase to drive up wages.

A more elastic labour supply means that for a given increase in the wage level there is a larger increase in quantity of labour supplied. In Figure 4, the labour supply curve S2 is more elastic than S1. For a given increase in demand as represented by the demand curve shifting out from D1 to D2, the increase in wage along S2 will be from W1 to W3, while for the less elastic supply curve the increase in wage will be larger (from W1 to W2).
Estimates of the elasticity of supply of labour to ECEC for the U.S. range from 1.2 to 1.9 (Blau 1993 [U.S.]) or 1.15 (Blau 2001 [U.S.]); i.e., a 10% increase in the wage rate of ECEC workers, holding constant the wage rate in alternative

occupations, would increase the total number of ECEC hours worked by 11.5% accounting for both new entrants to the sector and increased hours by workers already in the sector. These estimates could explain why ECEC workers' wage gains are modest in real terms despite rapid growth in the demand for ECEC.[33] A potential explanation for the highly elastic supply of ECEC labour may be the high non-monetary value that people place on working in the sector.

Note that the labour supply curve will never be downward sloping, since workers prefer more income to less. At most, the labour supply curve will be horizontal if the elasticity of supply is infinite. Therefore, a highly elastic labour supply is not sufficient to explain a real wage decline.

Another possible reason that ECEC workers' wages have not risen faster, as indicated by Chevalier et al.'s (2006) Irish study, is that the employers have hired less-qualified staff. This phenomenon appears to be at work in Canada according to key informant interviews that highlight that the number of educational exemptions given by governments rise during periods of rapid demand increases. Walker (1992) finds that childminders in the U.S. receive no returns to experience or to education. For Canada, the discussion in the previous section on real income indicates that people with post-secondary education in ECEC in the early childhood educators and assistants occupation receive higher income than less-educated workers, but that the income gains associated with further education are lower than for other occupations. This means that well-educated individuals have a relatively modest monetary incentive to enter the profession and lower-educated workers have little incentive to upgrade their skills.

The findings discussed above on the labour supply of ECEC workers indicate that there exists a potentially large and committed labour force. However, for many potential ECEC workers the low wage rate acts as a disincentive to continue to work in the sector. This is particularly the case when ECEC workers become mothers themselves.[34]

Section 3C: Employer Characteristics' Influence on Wages

Employer characteristics may be part of the cause for the wage conundrums in the ECEC sector. There are often substantial differences between wages offered by for-profit, non-profit and municipal centres. Municipal centres offer higher wages than non-profit centres, and non-profit centres offer higher wages than for-profit centres. Most of the literature focuses on the differences between non-profit and for-profit centres. There is a general tendency among provinces/territories to prefer non-profit to for-profit centres (Cleveland, 2008). For example, the wage grant per worker that Ontario offers to non-profits is twice as high as the grant offered to for-profits. Quebec only offers operating grants to non-profit centres that have a board of directors with a parent majority. Saskatchewan has no for-profit centres as for-profit centres are precluded from accepting subsidized children and have to have a parental advisory committee. Manitoba has put in place a new policy to encourage recruitment and retention by investing in the non-profit sector, and has regulated pay scales. The other provinces/territories mentioned in the study—British Columbia, Alberta, New Brunswick and Yukon—fund their centres (non-profit and for-profit) equally.

Employer Wage Analysis

There have been several U.S. studies that have tried to isolate the effect of non-profit status on ECEC worker wages by taking into account factors such as staff training and the local unemployment rate. Preston's (1988) U.S. study found no wage difference between non-profits and for-profits in the competitive sector, while a non-profit wage premium of 5%-10% was found in the government subsidized sector. By contrast, Mocan and Tekin's (2000) U.S. study found a substantial non-profit compensation differential between 8%-10%. Mocan and Viola's (1997) U.S. study found an overall non-profit wage premium, which became insignificant once they undertook a finer division of the non-profit sector (religious centre, publicly funded centre, etc.). They also found no impact of firm profits on wages, and a positive relationship between centre size and wages.

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[33] Chevalier et al. (2006).

[34] Chevalier et al. (2006).

The later finding was explained by the fact that centre managers have a harder time observing the effort of employees in larger centres and therefore paid them a higher wage to discourage them from shirking.

For Canada, Cleveland and Hyatt (2000), using the *Caring for a Living Survey* (1991) and isolating the effect of centre type, found a non-profit-to-for-profit wage premium of 13%. Furthermore, the municipal wage premium is even higher at 31%. Cleveland and Hyatt divide the non-profit wage premium by type of centre. The non-profit wage premiums are 20% or higher in centres based in the university, college, public school, corporate, hospital, and community organization sectors. Non-profit wage premiums are 11-14% higher in independent, parent co-operative, private school and government agency centres. There are no significant wage premiums for religious organizations. If additional variables are accounted for, such as parent fees as a percentage of revenue, firm size and fringe benefits, then the wage premium in the first group of non-profits becomes 11%-24%, while the wage premium for the second group becomes 7%-9%. The wage premium for religious organizations remains insignificant.

Cleveland et al. (2007) looked at data for the two largest providers of child care services: the province of Quebec and the City of Toronto. Quebec data for 2003 reveal that non-profits hire more ECE-trained staff and consequently spend a larger proportion of their wages on ECE staff (70% for non-profits versus 47% for for-profits). The hourly teacher wage in non-profit centres is 24% higher than in for-profit centres. Another type of centre, municipal centres, have 100% ECE-trained staff and hourly wages that are five dollars higher than those of non-profit centres. Toronto data for 2005 show an ECE-trained teacher wage differential of 27%. For-profits are less likely to receive wage grants and are usually larger than non-profits: the percentage of wages covered by grants is 6.2% for for-profits and 22.3% for non-profits; the average number of preschool spaces is 44.4 for for-profits and 34.7 for non-profits. Looking at national data from *You Bet I Care*, Cleveland et al. (2007) find that non-profits provide a gross hourly wage premium that is 30% higher than for-profits.

Cleveland (2008) used 2007 data from Toronto to find that for all three categories of pre-kindergarten children (infants, toddlers and preschoolers) the percentage of ECE-qualified teaching staff, the hourly wages of teaching staff and the teaching staff salary expenditures are all significantly higher in non-profit establishments than in for-profits. The funding composition of for-profits and non-profits is quite different. Non-profits receive a significantly higher percentage of their revenue from parents, and a significantly higher percentage of their revenue from grants. For-profits receive a significantly higher percentage of their revenue from subsidies for taking in disadvantaged children.

Key informant interviews conducted as part of the *Understanding and Addressing Workforce Shortages in ECEC Project* research identified employer characteristics that were thought to impact wages, including:
- Non-profit centres with a parent majority board were more likely to pay lower wages than non-profit centres with a board that was not composed primarily of parents.
- A greater number of spaces in a centre were deemed to lower worker wages.
- Employers who operated multiple centres were thought to pay less to their workers.
- Higher grants as a percentage of total revenue were theorized to increase the wages paid to workers due the resulting extra resources.
- The attachment of a centre to a school was thought to increase worker wages due to the fact that these centres paid lower rents.
- For-profit centers were deemed to be more apt to take on subsidized children due to the fact that their parents were more likely to keep their children there during recessions.
- The interplay between the number of subsidized children and auspice of centres means that workers would most likely be paid less in centres with a high proportion of subsidized children.

It is important to note that the statements above reflect the opinions of some of the key informants. To test these hypotheses as well as the findings below, a regression equation was used. Results are discussed on page 38.

The same data set in Cleveland (2008) was used for empirical evidence on whether these hypotheses hold. Summary statistics on wages, training and the employer characteristics that impact wages by auspice are listed in Table 10 below. Unfortunately, municipal centres could not be used in this analysis since there was no available wage data for these centres. From Table 11 it can be seen that:

- Hourly wages for ECE-educated workers are much larger for non-profit centres than for-profit centers, although the variation in wages is larger for non-profits.
- Quality or training of workers, as measured by ECE-educated worker hours as a percentage of total hours, is much higher for non-profit centres.
- As stated by Cleveland (2008) earlier, fees and grants make up a higher proportion of total revenues for non-profit than for-profit centres.
- For-profit centres are more apt to take subsidized children as was indicated by the key informants above.
- Over half of non-profit centres are attached to a school, but this is the case for very few for-profit centres.
- For-profit centres are larger than non-profit centres, but non-profit employers own more centres.

Table 10: Summary Statistics for Employer Characteristics								
FOR-PROFIT	**WAGE**	**TRAINING**	**FEE%**	**SPACE**	**SIZE**	**GRANT%**	**SCHOOL**	**SUBCH%**
Mean	16.45	0.58	0.24	74.61	2.46	0.04	0.07	0.74
Median	16.23	0.55	0.12	70.00	1.00	0.04	0.00	0.84
Variance	5.15	0.02	0.06	1100.77	5.87	0.00	0.07	0.06
NON-PROFIT	**WAGE**	**TRAINING**	**FEE%**	**SPACE**	**SIZE**	**GRANT%**	**SCHOOL**	**SUBCH%**
Mean	20.24	0.70	0.48	59.72	11.32	0.11	0.63	0.47
Median	19.80	0.69	0.51	54.00	2.00	0.13	1.00	0.46
Variance	10.49	0.03	0.08	891.12	388.08	0.00	0.23	0.09

To determine the impact of these employer characteristics on worker wages the following regression equation is used (N is a non-profit variable which is 1 when the centre is non-profit and 0 when it is for-profit):

$$WAGE = \beta_0 + \beta_1 N + \beta_2 FEE\% + \beta_3(N*FEE\%) + \beta_4 SPACE + \beta_5 SIZE + \beta_6 GRANT\% + \beta_7 SCHOOL + \beta_8 SUBCH\%$$

The regression results for this equation are listed in Table 11. Following the analysis, the authors of this study found the effects of employer characteristics on wages are as follows:

- Non-profit status does indeed increase the wage of ECE-qualified workers.
- Worker wages decrease with an increase in percentage of for-profit center revenues coming from fees.
- For non-profit centres, the effect of an increase in fees as a percentage of revenues on wages is not significant. Therefore, there is little support for the hypothesis that parent majority non-profit boards are lowering worker wages when they try to lower fees.
- Larger employers seem to have some monopoly power, since there is a negative relationship between worker wages and employer size, with size based on either the number of spaces in centres or the number of centres per employer.
- Grants as a percentage of revenues and centres' intake of subsidized children have no effect on worker wages.
- The linkage of centres to schools has a very positive effect on wages.

To see how these employer characteristics affect the training of workers, ECE-educated worker hours as a percentage of total hours are regressed against the same employer characteristic variables. The non-profit term, N, is found to be insignificant in this new regression (see Training 1 in Table 11). Dropping the interaction term N*FEE%, which is highly correlated to the terms N and FEES%, gives the results quality 2 in Table 11. The results of the regression are:

- The new estimate of non-profit status on worker training is positive and relatively significant.

- The numbers of center spaces affect worker training negatively, while the number of centres per employer affects worker training positively.
- School attachment exerts a positive impact on training.
- The percentage centre intake of subsidized children affects training very negatively.
- The grant and fee composition of revenue has no effect on training.

Table 11: Employer Characteristics Effect on Wages and Training						
	WAGE		TRAINING 1		TRAINING 2	
CONSTANT	18.33	***	0.716	***	0.709	***
N	3.14	***	0.034		0.042	*
FEE%	-2.21	*	0.006		0.030	
N*FEE%	2.08	*	0.028		-	
SPACE	-0.01	***	-0.001	***	-0.001	***
SIZE	-0.07	***	0.001	*	0.001	*
GRANT%	0.81		0.093		0.091	
SCHOOL	0.81	***	0.033	**	0.033	**
SUBCH%	-0.38		-0.118	***	-0.118	***
* Significant at a 10% level. ****** Significant at a 5% level. ******* Significant at a 1% level.						

Section 3D: Demand Versus Wage Growth

In the previous section, the data indicated that real wages for the ECEC occupation declined from 2000 to 2005, and the real wage for hourly paid employees in ECEC fell from 2000 to 2007, but the real wage for all employees increased. Are these changes "reasonable" or do they reflect an unusual divergence between demand and wages?

It seems implausible that there was a continuous increase in monopoly power over this period, so the explanation likely lies elsewhere. Blau's (2001) U.S. study shows how to use demand analysis to determine what the increase in real wages should be, based on the rise in demand for ECEC and the estimated ECEC labour supply elasticity with respect to wages. This section follows his approach and uses some of his assumptions along with Canadian data in order to illustrate the labour market dynamics between the demand for ECEC workers and real wages.

Figure 5: The Market for ECEC Labour
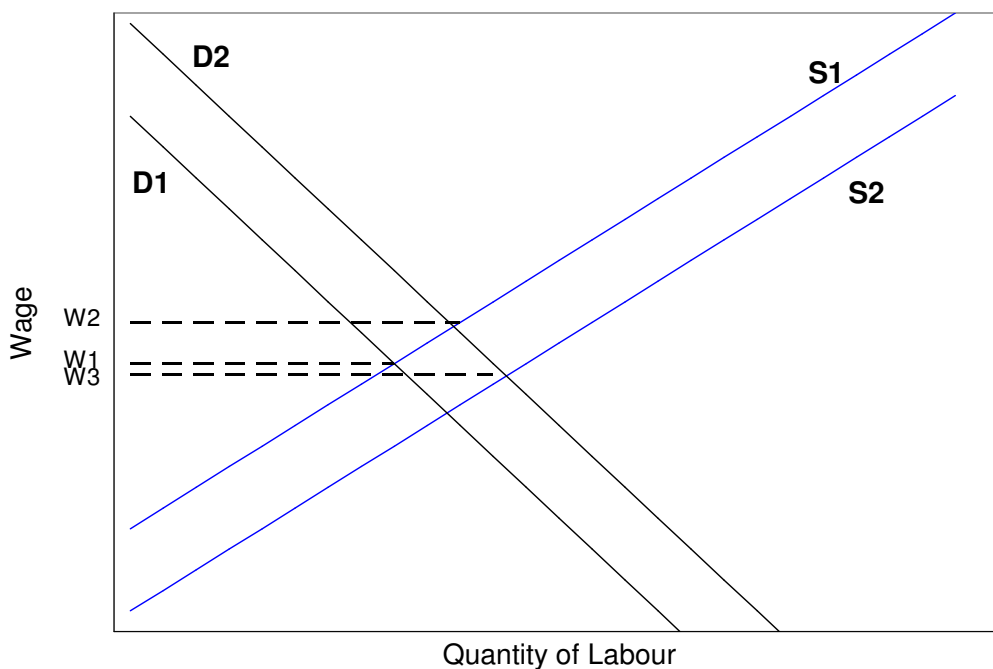
Source: Blau (2001).

Blau's approach is illustrated in Figure 5. The increase in the demand for ECEC labour from 2000 to 2005 (the census period discussed above associated with the real income measures) or from 2000 to 2007 (the SEPH period discussed above) is represented in the figure by the shifting out of the demand curve from D1 to D2. This should cause the real wage for ECEC workers to increase from W1 to W2. The exact wage increase is determined by the slope of the supply curve. The increase in supply caused by the increase in wage is the labour supply elasticity. If the actual change in the real wage is smaller than W1 to W2, then we can infer that the supply curve has shifted out from S1 to S2 for some reason, diminishing the increase in real wages or causing them to decline, as shown in the figure, from W1 to W3. Such a shift in supply might occur if, for example, a large influx of lower-qualified people sought employment in the ECEC sector.

We combine Blau's labour supply elasticity of the number of workers with respect to wages of 0.73 and the elasticity of 0.42 in the number of average hours worked with respect to wages. This combination gives a total hours worked elasticity of 1.15 (0.73+0.42=1.15) with respect to wages. Blau uses the per cent increase in the participation rate of mothers to represent the change in the demand for ECEC, although it is not clear why he uses this measure to reflect the increase in services. In this estimate, we use the per cent change in the total hours worked by people in the ECEC industry from the SEPH, which shows that hours increased by 40.7% (5.0% on average).

Blau used a price elasticity of demand for ECEC of -0.34 and a labour cost share estimate of 0.70 in child care centres, which implies an elasticity of demand for ECEC labour of -0.238 (-0.34*0.70). Given the supply elasticity of 1.15, a 40.7% increase in demand for ECEC would cause the real ECEC wage rate to rise by 29.3%.[35] This increase in real wages exceeds what was achieved by all employees and even salaried employees during 2000 to 2007. Canadian demand

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[35] As indicated by Blau (2001), the basis for the calculation is simple supply-demand analysis. Let $Log(Qs)= \alpha Log(W)+Log(X)$, $Log(Qd)= \beta Log(W)+log(Y)$, where Qs is the quantity of child care labour supplied, Qd is the quantity of child care demanded, W is the child care wage, α is the supply elasticity, β is the demand elasticity, X is a factor that causes supply to shift, and Y is a factor that causes demand to shift. In equilibrium, Qs=Qd, and we can solve for the percentage effect on ECEC wages of a given percentage demand shift as $\Delta Log(W)=[1/(\alpha-\beta)]*\Delta Log(Y)$. In our calculations for the ECEC occupation E217 over 2000 to 2005, $\Delta Log(W)=[1/(1.15-(-0.238))]* \Delta Log(Y)=0.72*\Delta Log(Y)$. The observed demand shift of 40.7% means the predicted increase in real wages is 0.72*40.6%=29.3%.

for ECEC services is more price-sensitive than in the U.S. If a higher price elasticity is used, the implied increase in wages would be less. However, even if we use a price elasticity for demand of -1, the increase in real wages would be 22%, which is higher than the real wage increase of salaried or hourly paid employees. And if we use the highest elasticity of supply discussed above of 1.9, then the real wage should have increased by 19.0%, which is close to what salaried employees achieved on an hourly basis, but still well above what all employees and those paid by the hour achieved over that period. Only if we use a price elasticity of -1 combined with a supply elasticity of 1.9 does the implied real wage increase drop to 15.7%, which is less than what salaried employees earned, but is still more than the increase in real wages for employees paid by the hour.

From this analysis, it is clear that the gains in real wages lag behind the real wage gain that the increase in demand suggests should have occurred. This means that some other factor has caused the ECEC labour supply curve to shift out. While it is not clear from this analysis what that factor might be, interviews with key informants suggest that there was an increase in education exemptions during periods of strong demand for workers due to increases in child care spaces.

There are several reasons for the low real wage increase: the price sensitivity of parents in Canada and/or a higher responsiveness of labour supply to wages, and a compositional shift toward lower-qualified and lower-paid employees. As long as the increase in less-qualified staff results in a concerted plan to improve educational credentials, this reaction should be a short-term response. It could lead to higher educational attainment, better quality ECEC, and higher wages for the sector as a whole over time. However, the use of unqualified staff when demand for ECEC services rises means an effective cap on the wages of qualified workers. These workers are not competing against the supply of qualified workers, but against everyone who has a high school certificate or less—a vast supply of potential workers. This dynamic will remain as long as the primary focus is on the quantity of ECEC services as opposed to quality.

CONCLUSION

The demand for ECEC workers is dictated by the demand for ECEC services due to government regulations that determine the ratio between staff and children. This means that to understand the demand for ECEC workers, one must first understand the demand for ECEC services. A long list of factors influence the demand for child care services, including: economic factors, family characteristics, government programs, availability and accessibility, and other factors such as ECEC quality.

One of the most important factors in understanding the demand for ECEC services is the price sensitivity of parents. Canadian parents are found to be more price sensitive than parents in other countries. Researchers have also found that Canadian demand for ECEC increases by relatively less than other countries when mother's wages rise. The combination of a high sensitivity to price changes with a low tendency to boost demand for ECEC as mothers' wages rise means that price changes will dominate real income gains in determining the demand for ECEC services. This dynamic will have direct implications on the demand for ECEC workers.

Research indicates that parents value quality, but have difficulty in assessing the quality of ECEC they are purchasing. A U.S. study finds some evidence of moral hazard where the centres with positive observable traits tend to produce a lower level of quality for unobservable items. Demand for quality is curtailed if parents cannot distinguish between high-quality and low-quality services. This can be described as a market failure, and is a reason for government involvement to encourage a more socially optimal outcome. One way this type of market failure can be overcome is by providing information about the quality of services offered by ECEC providers. Another way is via regulations.

Higher Levels of Demand in ECEC
The research shows that expansion, replacement and recruitment demand are much higher for ECEC workers than the average for all other workers:
- Expansion demand is stronger for ECEC workers since employment is growing more quickly in the sector than in other occupations.
- Turnover rates are higher in ECEC than in other occupations and in fact most of the need for ECEC workers is due to replacement demand because of people leaving their jobs.
- Since both expansion demand and replacement demand in ECEC are much higher than for other occupations on average, total recruitment demand is also higher. High workforce turnover imposes recruitment challenges, and can decrease the quality of care that children receive.

Training has an impact on turnover in some circumstances. Assuming—as many researchers do—that labour markets are imperfect, it is likely that both the employer and employee benefit from employee training. Research indicates that firm-sponsored training allows the accumulation of firm-specific human capital, while off-the-job training allows the accumulation of more general human capital. Women who received employer-provided and job-related training had a lower probability of changing employer or transitioning to non-employment. For men, training made no significant difference to this type of turnover.

Lower Supply of Qualified Workers
ECEC worker supply is determined by the number of ECEC workers and the hours they work. The number of available ECEC workers depends on how many school leavers and migrants enter the workforce and the number of workers who choose to remain in the sector. There is evidence of downward pressure on enrolment rates in some provinces. In addition, the evidence suggests that more than half of ECE-qualified workers do not end up working in the sector. This has implications for the quality of ECEC services since this is influenced by the quality of the ECEC workers, which in turn is influenced by level of ECE education. In addition, unions affect both the quality and supply of ECEC workers.

Why Wages Remain Low

One of the conundrums of the ECEC labour market is the low pay of the workers considering their level of education. There are several reasons why wages can remain low:

- Employers might have some degree of monopoly power.
- There could be non-monetary benefits from working in the sector (see Mocan and Tekin, 2000). The labour donation hypothesis suggests that ECEC workers consider their work important to society, and are willing to work in the sector even for low pay.
- Cleveland and Hyatt (2000) indicate that the low wage for ECEC workers may reflect discrimination, or other institutional factors that lower the wage rate amongst young, untrained, female workers.
- From the demand side, low wages may also reflect the tendency of many parents to believe that the purpose of ECEC is fundamentally custodial, and that the base-rate worker need not, therefore, have any special abilities. Parents' inability to determine quality will lower the demand for quality child care services and therefore reduce the demand for trained ECEC workers, which will place downward pressure on their wages.

Employer characteristics can influence wages. Non-profit status is shown to increase the wage of ECE-qualified workers. Worker wages decrease with an increase in the percentage of for-profit centre revenues coming from fees. However, for non-profit centres, the effect of an increase in fees as a percentage of revenues on wages is not significant. Both the number of spaces in centers and number of centers per employer affect workers wages negatively. Grants as a percentage of revenues and centres' intake of subsidized children are shown to have no effect on worker wages. On the other hand, the linkage of centres to schools has a very positive effect on wages.

Another labour market conundrum relates to the relatively small increase in wages despite a very strong increase in the demand for workers from 2000 to 2007. It is unlikely that there was a significant increase in the monopoly power of child care centres, or an increase in the non-monetary benefit to workers from working with children, therefore the answer must lie elsewhere.

An examination of the data using basic demand analysis shows that part of the reason for the lack of wage responsiveness is because of the price sensitivity of parents in Canada and the sensitivity of labour supply to respond to wage increases, albeit modest ones. Even after taking the greater sensitivity of parents into account, the analysis suggests that the gains in real wages in the sector are less than should have occurred given the increase in demand. This means that some other factor has caused a significant increase in the ECEC labour supply.

Interviews with key informants suggest that there is an increase in education exemptions for child care centres during periods of strong demand for workers due to increases in child care spaces. Therefore, part of the reason for the low real wage increases in the sector is a compositional shift toward lower-qualified and lower-paid employees during periods of strong demand. As long as this increase in less-qualified staff results in a concerted plan to improve educational credentials, this reaction should be a short-term response. It can lead to higher educational attainment, better quality ECEC and somewhat higher wages for the sector as a whole over time.

However, ECE-trained workers lose out because the immediate concern whenever demand rises tends to be on the quantity of ECEC services, rather than quality. This means wages for qualified workers will never catch up to what they could have been because these workers are not competing against the supply of qualified workers. Instead they are competing against everyone who has a high school certificate or less—a vast supply of potential workers. This effectively puts a cap on the pay of ECE-trained workers.

APPENDIX: Factors that Affect Demand for Early Childhood Education and Care

Table A.1: Factors that Affect the Demand for ECEC Quantity

Family Characteristics

Number of preschool-age children
Number of school-age
Mother's age
Lone parent versus two-parent families
Number of siblings
Age of siblings
Age of youngest child
Ethnic and immigration groups
Availability of relative or neighbour

Economic Factors

Price of ECEC
Mother's after-tax wage
Father's (or family) income
Labour force status (mother's status jointly determined with decision concerning child care)
Working hours of parents
Transportation costs

Government programs

Attributes of parental leave
The percentage of uptake of parental leave
ECEC regulations that affect quality and/or cost (e.g. staff/child ratios)
Direct and indirect financial subsidies to private providers, such as grants, contracts, and tax incentives
Financial subsidies (direct and indirect) to parents, such as cash benefits and allowances to pay for the services, tax benefits to offset the costs, cash benefits that permit parents to remain at home (and stop working) without major loss of income

Availability and Accessibility

Availability of informal caregivers within household (e.g., older child, parent, etc.)
Availability of informal caregivers outside household (e.g., relatives or neighbours)
Availability of formal ECEC
Accessibility of formal ECEC
Distance to place of residence
Opening hours and flexibility

Other Factors

Quality of ECEC
Mother's education
Father's education

Table A.2: Factors that Affect the Demand for ECEC Quality
Family Characteristics
Mother's age Siblings present Age of youngest child Ethnic and immigration groups Availability of relative
Economic Factors
Price of ECEC quality Mother's after-tax wage Family income
Government programs
ECEC regulations that affect quality (e.g. staff/child ratios)
Other Factors
Mother's education Father's education

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GLOSSARY OF TERMS

Assumptions – Judgements concerning unknown factors and the future which are made in analyzing alternative courses of action. Assumptions are made to support and reasonably limit the scope of the analysis.

Asymmetric Information or Information Asymmetry – A transaction where one party has more or better information than the other. This creates an imbalance of power in the transaction. In other words, a consumer can know less about the attributes of a product than the seller. The costs of finding out more information are prohibitive so the consumer remains less knowledgeable. For example, if a car is a lemon, only the seller of the car knows it is not a good car. Asymmetric information means that there is still a market for cars that are lemons.

Augment – To enlarge or increase.

Benefits – In the benefit/cost ratio calculation, benefits refers to the quantitative and qualitative improvements expected or resulting from an investment. Depending on the context in the report, benefits also refers to the improvement in welfare that consumers or parents derive from using child care services or other goods and services.

Benefit/Cost Ratio – An economic indicator of cost-effectiveness. The measure indicates the amount of benefits returned for each dollar invested. The ratio is computed by dividing present value benefits by present value costs.

Buying Power – The value of money as it relates to the quantity and quality of goods or services that households or individual consumers can afford to buy.

Competitive Outcome – In economics the competitive outcome occurs where there is "perfect competition". Perfect competition describes the theoretical situation where there is a homogeneous product, there are a large number of consumers and producers, low barriers to entry, so that there is no market power, and there is perfect information for consumers and producers, and firms aim to maximize profits. Under these conditions marginal costs equals marginal revenues and the outcome maximizes the benefits to society if all costs and benefits are private. In equilibrium, the quantity supplied equals the quantity demanded. If competition is not "perfect" the outcome will not be the competitive outcome. (see Imperfect Competition)

Consumer Price Index (CPI) – An index of the cost of all goods and services to a typical consumer.

Correlation – A statistical relationhip between two or more variables. In this relationship the systematic changes in the value of one variable are accompanied by systematic changes in the other.

Cost Effective – Returning a benefit that justifies the initial investment.

Cost Savings – Benefits realised by eliminating a planned expenditure, such as a budgeted or contractual expense.

Cross Price Elasticity of Demand – The responsiveness of demand for a product to a change in the price of other related products.

Discount Rate – A rate used to relate present and future dollars. Discount rates are expressed as a percentage and are used to reduce the value of future dollars in relation to present dollars. This equalizes varying streams of costs and benefits, so that different alternatives can be compared. Discount rates reflect the time value of money.

Discounted Costs or Benefits – Future years' costs or benefits that have been multiplied by a discount factor to convert them to their present value - also called present value costs or benefits.

Economic Model – A theoretical representation of economic reality showing the interrelationships between selected economic variables.

Economies of Scale – The cost advantages a firm obtains due to the expansion of production.

Economy – The realized system of human activities related to the production, distribution, exchange, and consumption of goods and services of a country or other area.

Elasticity – The ratio of the percent change in one variable to the percent change in another variable.

Estimation – Method of quantifying the relationship between one or more variables in a statistical manner. The parameters of a model are statistically estimated using the measured data.

Excess Demand – The quantity demanded exceeds the quantity supplied at the prevailing price.

Expansion Demand – Measures new jobs being created through an increase or expansion of economic activity.

Fixed Cost – Costs that do not vary over time.

GDP – Gross Domestic Product is the total dollar value of all goods and services produced in a particular economy in a given year.

Human Capital – The sum total of a person's productive and technical knowledge, experience and training.

Hedonic Regression – A method of estimating demand or value. The method reduces the item being researched into its constituent characteristics, and estimates how much value each characteristic contributes. Hedonic models are most commonly estimated using regression analysis, although more generalized models, such as sales adjustment grids, are special cases of hedonic models.

Impact Analysis – A technique to assess the extent to which changes in assumptions or input variables will affect the outcome.

Imperfect Competition – The competitive situation in any market where the necessary conditions for perfect competition are not satisfied. This occurs if one of the assumptions of perfect competition are not satisfied, such when the producer has some market power in the product or labour market.

Income Elasticity of Demand – Reflects the responsiveness of demand for a good or service to a change in the income of people demanding the product. It is calculated as the ratio of the percent change in demand to the percent change in buyers' income.

Information Asymmetry or Asymmetric Information – A transaction where one party has more or better information than the other. This creates an imbalance of power in the transaction. In other words, a consumer can know less about the attributes of a product than the seller. The costs of finding out more information are prohibitive so the consumer remains less knowledgeable. For example, if a car is a lemon, only the seller of the car knows it is not a good car. Asymmetric information means that there is still a market for cars that are lemons.

Inflation – A persistent rise in the general level of prices over time.

Investment – An expenditure of funds to acquire a new capability or capacity that provides a stream of future income.

Labour Donation Hypothesis – The labour donation hypothesis states that workers in the non-profit sector are more concerned about the nature of the service they are providing, than the wage they are paid and therefore they are willing to work for a wage which is less than they could earn elsewhere. They are essentially "donating" part of the wage they could earn elsewhere to the employer because of the broader social benefits of their work.

Labour Income – The sum of wages and salaries plus supplementary labour income. Supplementary labour income is defined as payments made by employers for the future benefit of their employees and is comprised of employer contributions to employee welfare, pensions, workers compensation and employment insurance.

Local Monopoly Power – Local monopoly power exists when a seller faces no other local competitors within a reasonable distance who offers a similar set of products. This power allows businesses to raise prices above levels that would exist under competitive conditions.

Marginal Cost – The increase in total cost that arises from an extra unit of production.

Marginal Product – The increase in output that arises from an additional unit of input.

Market Dynamics – The process by which market adjustment takes place.

Market Failure – When the free market does not efficiently allocate goods and services to achieve the greatest possible consumer satisfaction. That is there exists another outcome where all involved can be made either better off or at least as well off. Market failure can be viewed as a situation in which the free market outcome is an unsatisfactory result for the society. Market failures are often associated with non-competitive markets—such as monopolies—externalities—impact on a party that is not directly involved in the transaction—or public goods—a good that is non-rivalled, which means that the consumption of the good by one individual does not reduce the availability of the good for the consumption of others and non-excludable, which means that no one can be effectively excluded from using the good.

Mean – The average of all values.

Median – The statistical point where 50% of the data is below the median value and the 50% is above.

Microeconomics – The branch of economics that studies the economy of consumers, households or individual firms.

Monopolist – someone who monopolizes the means of producing or selling something.

Monopolistic Competition – A market structure in which there are many sellers each producing a differentiated product. One type of monopolistic competition is a local monopoly, such as a retailer or hair dresser.

Monopoly – When a specific individual or enterprise has sufficient control over a particular product or service to significantly determine the terms of access by others.

Monopoly Power – The degree of power held by the seller to set the price for a good.

Monopsony – An example of imperfect competition, where only one buyer faces many sellers. As the only purchaser of a good or service, the "monopsonist" may dictate terms to suppliers in the same way that a monopolist controls the market for its buyers.

Moral Hazard – Related to information asymmetry, this is a situation in which one party in a transaction has more information than another, especially with respect to its actions and intentions. The party with more information has a tendency or incentive to extract an economic advantage at the expense of the other party in a transaction.

Net Benefit or Cost – The result of subtracting the total present value costs from the total present value benefits. Where benefits exceed costs, the result is a positive number, referred to as a net benefit. Where costs exceed benefits, the result is a negative number, referred to as a net cost. See also "Net present value".

Net Present Value (NPV) – The result of subtracting the total present value costs from the total present value benefits. Also referred to as net benefit or net cost.

Non-labour Income – The sum of all income received except current labour income (wages, salaries and supplementary labour income). Non-labour income includes investment income and transfer payments from governments and businesses, such as employment insurance and pensions.

Non-standard Employment – Employment that does not conform to the usual standard work week of 35-40 hours from Monday to Friday between 9 a.m. and 5 p.m. This includes part-time, temporary, and shift work.

Oligopoly – A market or industry dominated by a small number of sellers (oligopolists).

Oligopsony (Monopsonistic Competition) – A market form in which the number of buyers is small while the number of sellers in theory could be large.

Optimality – Condition of being best.

(Own) Price Elasticity of Demand – The responsiveness in the quantity demanded for a commodity as a result of the change in price of that commodity.

(Own) Price Elasticity of Supply – A numerical measure of the responsiveness of the quantity supplied of a product to a change in price of that product.

Participation Rate – The percentage of working-age individuals (aged 16-65) who are either working or consider themselves available for paid work.

Perfect Competition – An idealized market structure with large numbers of both buyers and sellers, all of them small, so that they act as price takers.

Predictor Variable – A variable that can be used to predict the value of another variable (as in statistical regression)

Present Value – The estimated current worth of future benefits or costs derived by discounting the future values using a selected discount rate and factor.

Productivity – The amount of output that is produced per unit of input; usually expressed in terms of output per unit of input over a specific time period.

Proxy Variable – Something that is probably not in itself of any great interest, but from which a variable of interest can be approximated.

Replacement Demand – Measures job openings required to replace workers changing occupations or leaving the labour force.

Reservation Wage – The lowest wage rate at which a worker would be willing to accept a particular type of job.

Sectoral – Of or pertaining to a sector.

Sliding Scale Fee – A system of charging clients for services based on household income and family size, allowing clients to pay what they can afford.

Statistical Regression – A collective name for techniques for modeling and analyzing numerical data used for prediction (including forecasting of time-series data), inference, hypothesis testing, and modeling of causal relationships. The techniques consist of values of a dependent variable (also called response variable or measurement) and of one or more independent variables (also known as explanatory variables or predictors).

Statistically Significant – A result that is unlikely to have occurred by chance.

Sunk Costs – A non-recoverable cost committed or expended prior to the start of a project. Because sunk costs are irrevocable, they are not considered in the cost/benefit analysis.

Supplementary Labour Income – Employers' social contributions that includes retirement allowances, contributions to employment insurance, the Canada and Quebec Pension Plans, other pension plans, workers' compensation, medicare, dental plans, short-and long-term insurance, etc.

Undiscounted Costs or Benefits – Future years' costs or benefits that have not been multiplied by a discount factor to convert them to their present value. In other words, projected costs or benefits.

Variable – A quantity that can assume any of a set of values.

Variable Costs – Costs that are volume sensitive: for example, charges for computer services are often volume sensitive.

Variance – Variance measures the deviation from an average or expected value (mean).

Wage Elasticity – The responsiveness of the quantity demanded of a good to the change in the wage of the people demanding the good. It is calculated as the ratio of the percent change in quantity demanded to the percent change in income.

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