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## Using discrete choice experiments to assess the preferences of new mining workforce to commute or relocate to the Surat Basin in Australia

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### ABSTRACT

Two choice modelling experiments have been used to examine how residents of a major urban centre would consider commuting or relocation options if they were to consider taking up employment in a rapidly growing resource region. The case study area focused on the Surat Basin in southern Queensland where recent increases in mining activity involve both coal mining and coal seam gas extraction. The preferences of residents of Brisbane, the state capital and closest major centre to the Surat Basin, were assessed in the experiment. The results identified increased salary as the most important factor, but respondents were also concerned about potentially offsetting influences such as high living costs and accommodation affordability/availability. Respondents indicated that the additional salary needed to take up employment in the Surat Basin was substantially higher for relocation options than for FIFO options.

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### Introduction

The recent rapid expansion in the resources sector in Australia has increased demand for skilled and experienced labour, together with concerns about labour shortfalls, particularly in regional and remote areas (Solomon et al., 2008; Deloitte Access Economics, 2011; Haslam McKenzie, 2011). Conservative predictions indicate that labour requirements for mining operations in Australia will increase by 44% between 2010 and 2016 (Skills Australia, 2011), with limited scope for labour to be supplied from local and regional areas. Already, large and increasing remuneration packages are required to attract staff in the mining sector. In May 2012, the average weekly cash earnings for a person in the mining industry in Australia (\$2337 per week) were more than double the average of \$1094 per week for all industries, and represented a 12% increase over a 2-year period (ABS, 2012). Understanding how workforce can be supplied in cost effective ways and the issues involved are important in the further development of the resources sector.

Since the 1980s, labour has increasingly being supplied into the mining industry in Australia from capital cities and large regional centres through fly-in/fly-out (FIFO) or drive-in/drive-out (DIDO) commuting patterns (referred to generically as FIFO in this paper), rather than attracting new workforce to live in local

communities (Houghton, 1993; Clements and Johnson, 2000; Rolfe et al., 2007). Typically these commuting workers will have an intensive block shift period of one or more weeks at the workplace, staying in an accommodation village, followed by an equivalent amount of time off work (Rolfe et al., 2007). Combinations of locally based workforce and various forms of long-distance commuting are now commonplace in mining operations in the two resource-rich states of Western Australia and Queensland, although there are some debates about the varying impacts on regional development (Houghton, 1993; Storey, 2001; Aroca and Atienza, 2011; Hajkowicz et al., 2011; Ivanova and Rolfe, 2011) and local communities (Lockie et al., 2009; Petkova-Timmer et al., 2009; Carrington and Pereira, 2011).

There has been little research undertaken to examine the factors and tradeoffs that prospective employees might consider in accepting a job in a remote rural area. To address the shortfall, the Queensland Resources Council commissioned a survey of employees in the resources sector where salaries, accommodation arrangements, career opportunities, reputation of employer and work roster were identified as equally important in making employment choices, and the choice to live locally or to commute from a distance was based on 'quality of life' factors (URS, 2012). However, little is known about the preferences of prospective employees, although increasing salary rates provide evidence from market data that it is difficult to attract new workforce. The economic importance of different work related factors on the

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demand for higher wages and remuneration packages are more difficult to evaluate because these are not directly traded in markets. A number of different assessment tools, known as non-market valuation techniques, may be adapted to help measure those non-market impacts.

The focus of the research outlined in this paper is to examine the factors that might influence the decisions of residents of a major urban centre to accept an employment opportunity in a rural and remote region and to explore their preferences for commuting and relocation options. The case study area focused on the Surat Basin in southern Queensland where recent increases in mining activity involve both coal mining and coal seam gas extraction). A stated preference technique, discrete choice experiment, was used to assess the preferences of residents of Brisbane, the state capital and closest major centre to the Surat Basin, for different factors associated with commuting and relocation employment options. The results from the survey are presented in this paper and the policy implications discussed.

### The relative merits of a FIFO workforce

The increased use of FIFO operations to supply labour into mining operations has been noted in countries such as Canada (Skaburskis, 1987), Chile (Aroca and Atienza, 2011), and Sweden (Ejdemo and Soderholm, 2011), with the tradeoffs between building new towns or commuting options outlined by Skaburskis (1987). There are a number of economic, social and logistical reasons for companies and service providers to establish FIFO workforce operations in the absence of functional towns (Storey, 2001; Haslam McKenzie, 2011), or to supplement labour from existing local communities (Rolfe et al., 2007). FIFO arrangements are also increasingly being used by other sectors of the economy, notably by the human services sector, to provide services to rural and remote communities (Sibbel, 2009).

Using a FIFO workforce has benefits for the employer, as it is less costly than providing infrastructure to accommodate workers in purpose built towns and it is easier to recruit skilled professionals who are difficult to attract and retain if required to live in remote locations (Haslam McKenzie, 2011). A FIFO arrangement also suits many employees and typically, these arrangements are associated with generous remuneration packages. However, as the practice of using FIFO labour increases, so too do concerns about a wider range of associated impacts. The costs of the FIFO lifestyle are not just limited to the harsh working conditions. Many studies have highlighted a broader range of social and psychological impacts, including, but not limited to:

- Impacts on children of FIFO families (Kaczmarek and Sibbel, 2008).
- Impacts on psychological well being of employees, their partners and families (e.g. Watts, 2004; Carter and Kaczmarek, 2009; Taylor and Simmonds, 2009; Torkington et al., 2011).
- Impacts of crime (Carrington et al., 2011).
- Impacts on remote indigenous communities (Guerin and Guerin, 2009).
- Fatigue related concerns about safety at the worksite (Hogan and Berry, 2000) and on the commute home for DIDO workers (DiMilia and Bowden, 2007; Torkington et al., 2011).
- Staff turnover (Beach et al., 2003).
- Drug and alcohol use (Carter and Kaczmarek, 2009; Carrington et al., 2010).
- General impacts (Storey and Shrimpton, 1991; Storey, 2008).

The other major concern about using a FIFO workforce relates to the fly-over effect and the loss of local benefits in rural/remote areas

(Houghton, 1993; Storey, 2001; Ivanova and Rolfe, 2011). In addition to the loss of locally accruing benefits, towns in close proximity to mining projects have incurred the negative impacts associated with an influx of FIFO workers. These non-resident workers are generally accommodated in workcamps, are not integrated into the local community and do not contribute to the social cohesion of the community (Carrington and Pereira, 2011). In the resources sector the FIFO workforce tends to be dominated by single men and can be associated with socially unacceptable behaviours (Lockie et al., 2009; Petkova-Timmer et al., 2009). As well, the influx of workers, both resident and non-resident, has reduced accommodation availability and affordability (Watts, 2004; Akbar et al., 2009), and increased pressure on the limited local infrastructure services (particularly on health services). In turn, the accommodation and infrastructure bottlenecks make living in small rural/remote communities less attractive to new employees and families who might consider relocating and residing permanently in the area—the very people the local communities are trying to attract.

There have been different approaches to address the impacts of mining on local communities. In Western Australia, the Government has introduced the Royalties for the Regions programme, designed to guarantee 25% of the State's mining and onshore petroleum royalties to go to regional areas. In Queensland, there has been greater focus on mitigating social impacts and placing conditions on new mining developments. Major projects now need a social impact assessment for project approval as well as a social impact management plan through the full mine life (Queensland Government, 2010a). Conditions may include a target level of local residential workforce, as well as requirements for housing development in communities even when a FIFO workforce is being employed (e.g. Queensland Government, 2011).

### Case study details and survey design

The case study focused on the Surat Basin in southern Queensland where recent increases in mining activity involve both an expansion of coal mining activity and the much newer development of a liquefied natural gas industry (mainly associated with extracting coal seam gas). The growth projections based on a medium-level scenario for potential resource development in the Surat Basin include estimates that by 2031:

- production of coal and coal seam gas is expected to increase 10-fold;
- the gross regional product will double;
- employment in the area will increase by an additional 12,500 full time equivalent positions;
- population will increase by 44%.

(Queensland Government, 2010b).

The expanding demand for employment in the region may largely be sourced from people currently living in Brisbane. Other regions in Queensland already have limited labour available to supply the resources sector, and Brisbane is a major population centre close to the Surat Basin (Fig. 1). Both commuting and relocation options would be available to new employees.

#### Survey design

Discrete choice experiments, also known as choice modelling, is a non-market valuation technique, meaning that it can be used to assess values for actions or preferences that are not revealed in market transactions. The technique requires respondents in a survey format to choose a single preferred option from a set of a number of resource use alternatives, typically repeated across

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