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# Does Human Development Influence Women's Labour Force Participation Rate? Evidences from the Fiji Islands

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**Abstract** Existing studies on human development and women's labour force participation rate shows mixed results. Some studies have found that human development influences women's labour force participation rate while other studies have found that there is no relationship between human development and women's labour force participation rate. This paper uses data from the United Nations Development Programme, World Bank and Asian Development Bank database to empirically determine whether human development influences women's labour force participation rate in Fiji. The findings of this study confirm that human development influences women's labour force participation rate both in the short run and long run. Currently, the most immediate need in Fiji is to review existing education policies that are targeted towards different gender and minority groups so that these policies can effectively contribute towards developing an egalitarian society.

**Keywords** Human development · Gender · Women's labour force participation rate · Fiji Islands

## 1 Introduction

In the recent decade, the importance of improving women's labour force participation rate has become a hotly debated topic in the economics literature. High levels of poverty, increasing gender inequality, low levels of women's labour force participation rate, high crime rate, corruption and increasing non-communicable diseases are some common problems endemic in developing countries (Durbin 1999; Beneria et al. 2000; Connelly et al. 2006). The Pacific Islands are not an exception to these problems. One of the possible

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solutions to these development problems is to improve women's labour force participation rate (Hill 2003a, b; Klasen and Wink 2003; Iversen 2003; Patel et al. 2007; Benería 2008). Existing studies on labor economics in the Pacific Island Countries have been reluctant in using a feminist approach to examine development problems faced by the Pacific Island Countries.

According to the World Bank (2014) database, women's labor force participation rate of Fiji increased from 25.52 % in the year 1990 to 33.60 % in the year 2013. The number of women employed and actively seeking employment in Fiji has increased by 8.08 % during this period. One of the key characteristics of Fiji's labour market has been lower labour force participation rate of women. The bulk of the women in Fiji's labour market is employed in the low income rural agriculture sector with few women earning wages and salaries. Culturally, women in Fiji are under represented in various facets of decision making in society (Rankin 2002; Basok and Piper 2012). As women are treated inferior in society, they are unable to find a decent employment that will help them to sustainably support their livelihood. As a result of this, gender exclusion in economic development has constrained women and minority groups prosperity in society. Though some economists might dispute this, there is enough statistical evidence to show that women's labour force participation rate is one of the major development problems faced by the Pacific Island Countries. Yet, there are no existing studies that have examined how human development influences women's labour force participation rate in the Pacific Island Countries (Griffin 2010; Austen et al. 2013).

In the recent decade, the United Nations together with other non-government organisations and Pacific Island leaders are accelerating their efforts on improving women's labour force participation rate in the Pacific Island Countries. There have been some improvements noticed on the lower levels of women's labor force participation rate in the Pacific Island Countries. The existing feminist work that addresses the factors that influence women's labour force participation rate has identified many factors. Undoubtedly, human development is one of the main factors highlighted by existing feminist literature. Existing studies that have examined the relationship between human development and gender equity have been quite reserved in adopting statistical tools that provides robust results on the relationship between human development and gender equity variables. Existing studies have largely used correlation analysis and regression estimators to examine the relationship between human development and gender equity variables (Okkolin et al. 2010; Cuban 2010; Sperandio 2011; Arar 2014).

The widespread importance given to male's progress is one of the possible reasons for the lack of literature on feminist approach. Another reason for the lack of literature on feminist approach lies in the absence of reliable data on human development and women's labor force participation rate. Existing feminist work on human development and women's labour force participation rate have either used missing data sets or are based on small sample size. This paper undertakes a macro level approach to examine the relationship between human development and women's labour force participation rate. In this study, the United Nations Development Programme, the World Bank and Asian Development Bank database were used to identify the proxies for human development and women's labour force participation rate. The human development in this study was proxied by the human development index and women's labour force participation rate was proxied by the number of women employed and actively seeking employment with respect to total labor force.

The topic considered in this paper is important for at least three reasons. Firstly, Fiji's women's labour force participation rate is lower than Solomon Islands and Papua New

Guinea. Low levels of women's labour force participation rate have persisted despite Fiji's high rankings on the human development index. Secondly, Fiji is experiencing demographic changes in the labour market because women's labour force participation rate are slowly increasing. The increase in women's participation in the labour market will change the salary cost structure as the labour market becomes more competitive.

This paper focuses on Fiji for two reasons. First, with few exceptions, women's labour force participation rate may differ by geographical region. It is essential to investigate the relationship between human development and women's labour force participation rate and the possible explanations underlying the relationship between these two variables. Second, existing studies have examined the relationship between human development and women's labour force participation rate by using correlation analysis and regression estimators. None of the existing studies have used ARDL bounds testing procedure to examine whether human development influences women's labour force participation rate. This study extends the existing feminist work by examining the relationship between human development and women's labour force participation rate.

This study contributes to the existing literature in two ways. First, this study contributes to the existing literature by using the Autoregressive Distributive Lag (ARDL) bounds testing procedure to investigate the relationship between human development and women's labour force participation rate. Existing studies have largely used correlation and regression analysis to test this relationship. Second, this study initiates the first attempt to integrate Sen's capability framework with the empirical modelling on human development and women's labour force participation rate. This paper uses Sen's capability framework to examine how investment in human development improves women's capabilities, core competencies and increase women's chances of securing paid employment.

This paper is organised as follows. Section two provides overview of the human development index and women's labour force participation rate. Section three provides theoretical perspectives and literature review related to human development and women's labour force participation rate. Section four outlines sources of data used in his study and section five outlines model specification. Section six presents research findings and section seven discusses the research findings. Section eight presents conclusion and policy implications.

## 2 Human Development Index and Women's Labour Force Participation Rate for Fiji

The human development index is a measure of long term economic progress and is based on three aspects of economic development. These three aspects of economic development are access to a proper standard of living, education and healthy lifestyle. In year 2013, Fiji's human development index was 0.724 thus positioning Fiji on number 88 out of 187 countries (UNDP 2014a, b). Fiji's progress on human development index can be compared with other countries. During the period 1980–2013, Fiji, Tonga and Malaysia have made significant progress on improving human development index (UNDP 2014a, b).

Figure 1 shows that Fiji's human development index has increased from 0.587 in the year 1980 to 0.724 in the year 2013. Fiji's human development index has improved by 0.137. This increase in the human development index can be attributed to several factors. Some of these factors include improvement in standard of living, increase in education

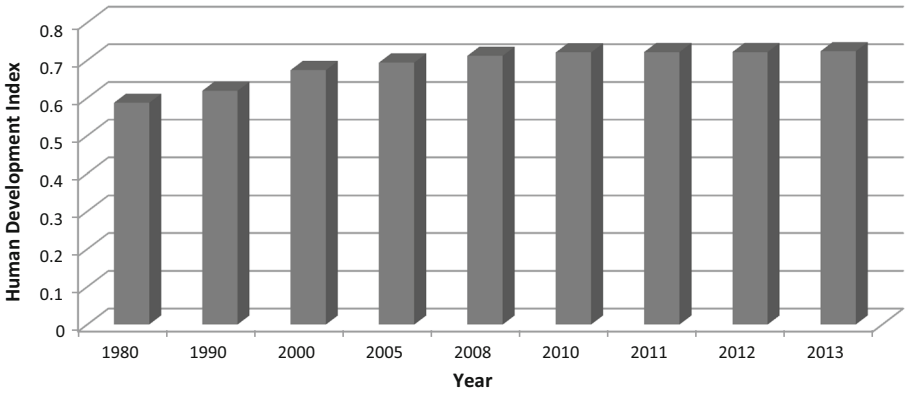


**Fig. 1** Human development index for Fiji. *Source*: Created by Author (2014) by using data from the United Nations Development Programme Database (2014a, b)

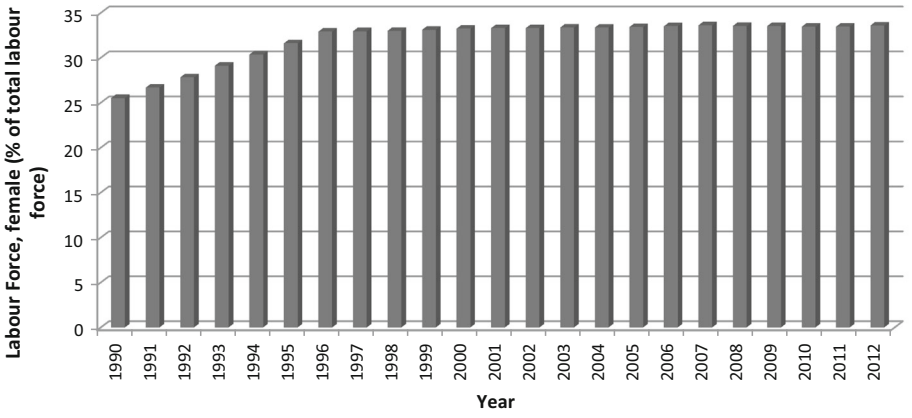


**Fig. 2** Women's labour force participation rate for Fiji. *Source*: Created by Author (2014) by using data from the World Bank (2014) database

opportunities for all races and groups and the provision of healthy lifestyle to Fiji citizens (UNDP 2014a, b).

Women's labour force participation rate of Fiji is significantly lower than men's. According to Forum Secretariat (2013), only 19 % of micro, small and medium enterprises are owned and operated by women. Low levels of women's labour force participation rate have been the result of traditional and cultural barriers and failure of government policies in providing equal education opportunities for women. Both i-Taukei and Indo Fijian women tend to have large extended families with younger children. This demographic characteristic of families in Fiji has contributed to lower women's labour force participation rate.

Figure 2 shows that woman's labor force participation rate in Fiji has increased from 25.52 % in the year 1990 to 33.60 % in the year 2012. Over the last 22 years, the women's labour force participation rate has increased by 8.08 %. Some of the factors that have

caused this increase are change in demographic composition of families, modernisation and change in cultural values. Majority women in Fiji are employed in the agriculture sector and males have always dominated public sector employment in Fiji (Duncan and Voigt-Graf 2008).

The next section will discuss theoretical perspectives and review literature related to human development and women's labour force participation rate.

## 3 Theoretical Perspectives and Literature Review Related to Human Development and Women's Labour Force Participation Rate

Existing studies have largely used qualitative framework to examine issues related to human development and women's labour force participation rate. Economists and researchers often view human development as a means of reducing poverty (Himmelweit 2002; Kantor 2005), gender inequality (Dijkstra and Hanmer 2000; Klasen and Schüler 2011), increasing women's economic empowerment (Rankin 2002; Peinado and Céspedes 2004) and reducing the crime rate (Floro and Pichetpongsa 2010; Fukuda-Parr et al. 2013; Vyas et al. 2015). These studies have recognised that lack of human development is one of the explanatory variables that accounts for issues related to gender inequality, poverty and high crime rate.

One of the prominent approaches used by economists and non-government organisations to analyse problems faced by developing countries is Amartya Sen's capability framework (Sen 1989; Sen and Anand 1990, 2000). The Human Development Index, Gender Related Development Index and Gender Empowerment Measure were developed by Sen's work on freedom (Sen 2004), poverty (Sen 1976) and social welfare (Sen 1999). The basic premise of Sen's capability framework is based on the ideology of improving human welfare so that nations become more healthy and knowledgeable. Human development relates to removing obstacles that individuals face daily. These obstacles are related to lack of accessibility of resources, war, civil strife and poor health condition (Anand and Sen 2000). Unlike some studies on economic growth and development (Alkire 2002; Asadullah et al. 2014), Sen's capability framework brings back gender equity to the centre stage of discussion on economic development. The capability framework focuses on three key facets of gender development; namely, expanding gender based capabilities (Frediani 2010), gender based freedom (Tikly and Barrett 2011) and measuring gender related development (Muffels and Headey 2013). Sen's capabilities approach defines well-being as a person's freedom of choice to focus on achieving those goals that are most important in his or her personal life. According to Sen, capabilities are the real freedom people have to make choices that enable them to achieve anticipated outcomes. The choices that individuals make daily are dependent on socioeconomic, political and cultural factors. These factors influence the choices that people make daily, thus constraining well-being outcomes (Binder and Coad 2011; Van Ootegem and Verhofstadt 2012).

Studies conducted by Hill (2003a, b), Robeyns (2003), Della Giusta et al. (2011) and Addabbo et al. (2014) have used Sen's capability framework to examine various development issues. Hill (2003a, b) used Sen's capability framework to examine the role of politics in enhancing human capabilities. Robeyns (2003) used Sen's capability approach to examine gender inequality in western countries. Della Giusta et al. (2011) examined variations in life satisfaction of both men and women in the United Kingdom by using Sen's capability framework. This study found that hours of paid employment and caring

for adults directly influences women's satisfaction. Addabbo et al. (2014) used Sen's capability framework to examine the children's capabilities in Italy and found that economic policies that enhances children's development also improves children's performance.

This paper adopts Amartya Sen's capability framework to examine the relationship between human development and women's labour force participation rate. There are two reasons for using Sen's capability framework. First, with few exceptions, none of the existing studies have integrated Sen's capability framework with empirical modelling on human development and women's labor force participation rate. Women possess unique capabilities that may influence their performance at work. Some women are able to recognise these capabilities and effectively use these capabilities for income generation. However, the bulk of the uneducated women population in the Pacific Islands are not able to do so; hence, they are not able to earn a living for their families by using their skills and capabilities. This paper uses Sen's capability framework to examine how investment in human development improves women's capabilities, core competencies and increases women's chances to secure paid employment. Second, existing studies have used Sen's capability framework to examine gender related development issues in European countries. However, none of the existing studies have used Sen's capability framework to examine gender related development issues in the Pacific Island Countries. This study integrates Sen's capability framework with empirical modelling on human development and women's labour force participation rate.

### 3.1 Human Development and Women's Labour Force Participation Rate

Human development and women's labour force participation rate are two crucial development concepts related to gender equality (Ransom and Bain 2011; McCabe et al. 2011; Skalli 2011). Gender equality is a multidimensional concept that includes human development and women's labour force participation rate (Neumayer and De Soysa 2011; Seguino 2011; Branisa et al. 2013). Some of the factors that improve women's labour force participation rate are empowering women and providing equality in the provision of opportunities and resources (Janssens 2010; Heath 2014). These factors are primarily short term solutions for improving women's labour force participation rate (Van Rijsbergen and D'Exelle 2013). The ultimate long term solution for improving women's labour force participation rate is providing equality in access to quality education (Das 2014).

Published research has recognised that human development improves gender equity (Htun and Weldon 2010; Molyneux and Thomson 2011; Potrafke and Ursprung 2012; Eastin and Prakash 2013). Cooray and Potrafke (2011) investigated whether political institutions, culture and religion influence gender inequality in achieving quality education. This study found that culture and religion influences gender inequality in achieving quality education. Interestingly, this study argued that autocratic political regimes do not discriminate females in providing quality education opportunities. Parallel to the findings of Cooray and Potrafke, studies conducted by Cherif (2010), Shafiq (2010) and Malik and Courtney (2011) found that discrimination against women in achieving quality education is a major problem in Muslim countries.

Many studies have argued that culture interacts in the relationship between human development and women's labour force participation rate. Skjortnes and Zachariassen (2010) qualitative study examined the problems related to gender and education in Madagascar. This study found that women's involvement in higher education activities improves women's economic empowerment; however, traditional family expectations has

opposite effect on women's economic empowerment. Parallel to the findings of Skjortnes and Zachariassen (2010), studies conducted by Okkolin et al. (2010), Cuban (2010), Sperandio (2011) and Arar (2014) found that as women's labour force participation rate increases, extended family pressures simultaneously increases. Interestingly, some studies have examined the causality between females labour force participation rate and total fertility rate by using the Granger causality framework with error correction term (Chevalier and Viitanen 2002; Narayan and Smyth 2003; McNown and Ridao-Cano 2005; Narayan and Smyth 2006). These studies are not relevant to the subject of analysis of this paper; however, these studies have used a similar empirical framework that will be used in this paper.

This study uses ARDL bounds testing procedure to examine the relationship between human development and women's labour force participation rate. There are two reasons for using ARDL bounds testing procedure in this study. First, none of the existing studies have tested the relationship between human development and women's labor force participation rate by using ARDL bounds testing procedure. There are studies that have tested the relationship between human development and women's labour force participation rate; however, existing studies have largely used correlation and regression analysis to test this relationship. Therefore, this paper hypothesises that:

**H1** Human development index and women's labour force participation rate are co-integrated in the long run.

**H2** Human development index significantly positively influences women's labour force participation rate in the short run.

**H3** Human development index significantly positively influences women's labour force participation rate in the long run.

This study extends the existing literature by using ARDL bounds testing procedure to examine the relationship between human development and women's labour force participation rate. Second, human development index and women's labour force participation rate are purely integrated to different order (see Table 1); hence, it is crucial to use ARDL bounds testing procedure to examine the relationship between human development and women's labour force participation rate (Pesaran et al. 2001).

The next section outlines the sources of data used in this paper.

**Table 1** Unit root test for human development index and women's labour force participation rate

| Countries | Augmented Dickey–Fuller (ADF) | | Phillips and Perron (PP) | | Kwiatkowski–Phillips–Schmidt–Shin (KPSS) | |
|---|---|---|---|---|---|---|
| | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) |
| HDI | −2.460582 | −4.524708[A] | −2.551429 | −4.562712[A] | 0.090520 | 0.110329[B] |
| WLFPR | −4.259936[A] | −1.745699 | −3.467171[C] | −1.745699 | 0.169825[C] | 0.147133[C] |

*Source*: Created by Author (2014) by using EVIEWS 8

[A] $p < 0.001$

[B] $p < 0.01$

[C] $p < 0.05$

## 4 Data

To examine whether human development influence women's labour force participation rate, this paper uses data from the United Nations Development Programme, World Bank and Asian Development Bank database. The United Nations Development Programme database was used to collect data on human development index. The World Bank and Asian Development Bank database were used to collect data on women's labour force participation rate. One of the major limitations of using the United Nations Development Programme, the World Bank and Asian Development Bank database was that data was only available from year 1990 to 2013. To generate robust results, time series data prior to 1990 and post 2013 was needed. To remedy this limitation, the ARDL bounds test was used as it generates efficient results while using small sample sizes (Chandran et al. 2010). In the source data sets, human development index is defined as a measure that incorporates three important dimensions needed to maintain a happy life. These three dimensions are (1) healthy life, (2) knowledge, and (3) good standard of living. The women's labour force participation rate is defined as the percentage of women employed and actively seeking employment. Data on human development and women's labour force participation rate was available from 1990 to 2013. Therefore, based on the availability of data, periods 1990–2013 was selected for this study. In this paper, the proxy for human development was human development index and proxy for women's labour force participation rate was percentage of women employed and actively seeking employment. The human development index and women's labour force participation rate were converted in natural log form before the analysis was conducted. Hence, HDI represents the human development index and WLFPR represents women's labour force participation rate (see Eqs. 1–6).

The next section outlines the model specification used in this study.

## 5 Model Specification

In this section, the model estimation strategy for Bai–Perron's multiple breakpoint test at one time, ARDL bounds testing approach and Toda Yamamoto Granger Non-Casualty test is specified.

### 5.1 Bai–Perron's Multiple Breakpoint Test at One Time

According to Garcia and Perron (1996), Lumsdaine and Papell (1995), Bai (1997) and Bai and Perron (1998, 2003), multiple structural breaks may be present in a trend function. Bai (1997) highlighted that sequential estimation of multiple breaks is superior to single breakpoint test and simultaneous estimation of multiple breaks. The superiority of sequential estimation of multiple breaks lies in its robustness to misspecification and numerical savings (Bai and Perron 1998, 2003). Estimating multiple breaks sequentially is a four step procedure (Bai and Perron 1998, 2003). Firstly, the breakpoint in the series is identified and the sample is divided into two sub-groups. Secondly, the parameter constancy of each of the two subsample is statistically determined. Thirdly, the newly estimated breakpoint is used to divide the corresponding sub-sample parameter into sub samples. Fourthly, the parameter constancy test is performed for the newly obtained sub-

samples. The breakpoint estimated by using the Bai–Perron's multiple breakpoint test at one time is given in Eq. 1.

$$\omega = \gamma - 1 \tag{1}$$

In Eq. 1, ω is number of break points and γ is number of sample. The break period identified by sequential estimation of multiple breaks will be used as the dummy variable in ARDL bounds testing procedure equations (see Eqs. 2, 3).

### 5.2 ARDL Bounds Approach

There are numerous studies published that intends to test the relationship between dependent and independent variables. Since the late 1980s, the majority of the existing studies has used two-step residual-based procedure to test for co-integration (Engle and Granger 1987; Phillips and Ouliaris 1990) and system-based reduced rank regression approach (Johansen 1991, 1995). According to Pesaran et al. (2001), these two procedures cannot be applied to dependent and independent variables that are integrated in different order. Pesaran et al. (2001) addressed this limitation of the two-step residual-based procedure to test for co-integration and system-based reduced rank regression approach by developing ARDL bounds testing procedure. The ARDL bounds testing procedure provides robust results when dependent and independent variables are integrated in different order. The order of integration of the dependent and independent variables is determined by performing unit root test. The ARDL bounds testing procedure with dummy variables is captured in Eqs. 2 and 3.

$$\begin{aligned}\Delta HDI_t = {} & \beta_{10} + \beta_{11} HDI_{t-1} + \beta_{12} WLFPR_{t-1} + \alpha_{10} Dum_s \\ & + \sum_{i=1}^{n} \alpha_{11i} \Delta HDI_{t-i} + \sum_{i=0}^{n} \alpha_{12i} \Delta WLFPR_{t-i} + \in_{t1}\end{aligned} \tag{2}$$

$$\begin{aligned}\Delta WLFPR_t = {} & \beta_{20} + \beta_{21} HDI_{t-1} + \beta_{22} WLFPR_{t-1} + \alpha_{10} Dum_s \\ & + \sum_{i=1}^{n} \alpha_{11i} \Delta HDI_{t-i} + \sum_{i=0}^{n} \alpha_{12i} \Delta WLFPR_{t-i} + \in_{t2}\end{aligned} \tag{3}$$

In this model, $HDI_t$ is human development index in time (t), $WLFPR_t$ is women's labour force participation rate in time (t), and $Dum_s$ is dummy variable for Bai–Perron's multiple breakpoint test at one time.

### 5.3 Toda–Yamamoto Granger Non-causality Test

According to Toda and Yamamoto (1995), even if variables are integrated in different order, the Vector Autoregression (VAR) can be estimated and general restrictions can be tested. This can be done by estimating the augmented VAR. According to Toda and Yamamoto (1995), the augumed VAR can be determined by using the following equation:

$$AVAR_i = \zeta + \varphi_{max} \tag{4}$$

In Eq. 4, $AVAR_i$ is augmented VAR, $\zeta$ is the lag length determined by VAR lag order selection criteria and $\varphi_{max}$ is the maximum order of integration of the dependent and independent variables determined by the unit root test. The Toda and Yamamoto (1995)

Granger non-casuality test for human development index and women's labour force participation rate presented in the VAR system is given as follows:

$$InHDI_T = \varphi_0 + \sum_{i=1}^{m+n} \alpha_{1i} InHDI_{t-1} + \sum_{i=1}^{m+n} \beta_{1i} InWLFPR_{t-1} + \in_{1t} \quad (5)$$

$$InWLRPR_T = \varphi_0 + \sum_{i=1}^{m+n} \alpha_{1i} InWLFPR_{t-1} + \sum_{i=1}^{m+n} \beta_{1i} InHDI_{t-1} + \in_{1t} \quad (6)$$

In this model, $HDI_t$ is human development index in time (t), $WLFPR_t$ is women's labour force participation rate and $\zeta$ is the lag length determined by VAR lag order selection criteria.

The next section will present the research findings.

## 6 Research Findings

### 6.1 Unit Root Test

The results of the unit root test are presented in Table 1. Three tests were used to determine the order of integration of human development index and women's labour force participation rate. These three tests were Augmented Dickey–Fuller (ADF), Phillips and Perron (PP) and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) unit root test. The ADF, PP and KPSS test rejects the null hypothesis of the existence of a unit root for the human development index at levels. The human development index is integrated utmost with the order of one (I(1)). The ADF, PP and KPSS test accept the null hypothesis of the existence of a unit root for women's labour force participation rate at level. The ADF and PP test results show that women's labour force participation rate is integrated utmost with the order of zero (I(0)) and KPSS results shows that women's labour force participation rate is integrated utmost with the order one (I(1)).

### 6.2 Bai–Perron's Multiple Breakpoint Test at One Time

The results of the Bai–Perron's multiple breakpoint test at one time is given in Table 2. The breakpoint in the human development index and women's labour force participation model is present in the year 1997. The breakpoint in the human development index and women's labour force participation rate model has occurred after 7 years interval. This information will be factored in while estimating the ARDL model by setting the dummy variable to one in the year 1997. During period 1990–1996, 1 % increase in human development index results in 451 % increase in women's labour force participation rate. Similarly, after the breakpoint, from year 1997 to 2013, 1 % increase in human development index results in 6.41 % increase in women's labour force participation rate.

### 6.3 Lag Order Selection Criteria Test

The results of the VAR Lag order selection criteria are given in Table 3. The LR, FPE, AIC, SC and HQ test results have selected maximum lag length of one to be used in ARDL bounds testing procedure and Toda–Yamamoto Granger Non-Causality Test.

**Table 2** Break type: Bai–Perron tests of L + 1 versus L sequentially determined breaks

| Variable | Coefficient | SE | t-statistic | Prob. |
|---|---|---|---|---|
| 1990–1996—7 obs | | | | |
| HDI | 451.0035 | 16.52736 | 27.28829 | 0.0000 |
| C | −253.5002 | 10.35832 | −24.47310 | 0.0000 |
| 1997–2013—17 obs | | | | |
| HDI | 6.416346 | 1.963831 | 3.267259 | 0.0039 |
| C | 28.96469 | 1.354992 | 21.37629 | 0.0000 |
| $R^2$ | 0.991533 | Mean dependent var | | 32.15183 |
| Adjusted $R^2$ | 0.990263 | SD dependent var | | 2.400616 |
| SE of regression | 0.236883 | Akaike info criterion | | 0.108511 |
| Sum squared resid | 1.122271 | Schwarz criterion | | 0.304854 |
| Log likelihood | 2.697865 | Hannan–Quinn criter. | | 0.160601 |
| F-statistic | 780.7126 | Durbin–Watson stat | | 2.603869 |
| Prob (F-statistic) | 0.000000 | | | |

Break selection: Trimming 0.15, Max. breaks 5, Sig. level 0.05

Breaks: 1997; dependent variable: women's labour force participation rate

*Source*: Created by Author (2014) by using EVIEWS 8

**Table 3** VAR lag order selection criteria

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | −14.54267 | NA | 0.283142 | 1.575492 | 1.674970 | 1.597081 |
| 1 | −1.562637 | 22.25148* | 0.090594* | 0.434537* | 0.583754* | 0.466921* |
| 2 | −1.555228 | 0.011996 | 0.099849 | 0.529069 | 0.728026 | 0.572248 |

*Source*: Created by Author (2014) by using EVIEWS 8

*LR* sequential modified LR test statistic (each test at 5 % level), *FPE* final prediction error, *AIC* Akaike information criterion, *SC* schwarz information criterion, *HQ* Hannan–Quinn information criterion

* Indicates lag order selected by the criterion

## 6.4 ARDL Bounds Test

The results of the ARDL bounds test is presented in Table 4. The F Wald test statistics are statistically significant ($p < 0.001$) and greater than the Pesaran et al. (2001) upper bound critical value. The results of the ARDL bounds test reveal that human development index and women's labour force participation rate are co-integrated in the long run. The findings of the ARDL bounds test supports hypothesis one. The Breusch–Godfrey Serial Correlation Lagrange Multiplier test statistics is not significant; hence, the null hypothesis of no

**Table 4** ARDL bounds test and Pesaran et al. (2001) critical values

| ARDL model | LM test—Obs*$R^2$ | LM Test—*p* value of Ho: NO serial correlation | F Wald test | Upper bound value | Lower bound value |
|---|---|---|---|---|---|
| ARDL (1, 1) | 1.067895 (0.2360) | 0.301400 (0.3279) | 14.40098 (0.0003) | 5.73 | 4.94 |

*Source*: Created by Author (2014) by using EVIEWS 8

**Table 5** F Wald test statistics for shortrun coefficients

| Test statistic | Value | *df* | Probability |
|---|---|---|---|
| F-statistic | 24.67233 | (2, 17) | 0.0000 |
| $\chi^2$ | 49.34466 | 2 | 0.0000 |
| Null hypothesis | | | |
| C(2) | 0 | | |
| C(3) | 0 | | |

| | Value | SE |
|---|---|---|
| Null hypothesis summary | | |
| Normalized restriction | 0 | |
| C(2) | 0.778932 | 0.112392 |
| C(3) | −2.375939 | 7.727372 |
| Restrictions are linear in coefficients | | |

*Source*: Created by Author (2014) by using EVIEWS 8

**Table 6** Estimated shortrun coefficients, error correction term and Pesaran et al. (2001) critical values

| Variable | Coefficient | SE | t-statistic | Prob. | Upper bound | Lower bound |
|---|---|---|---|---|---|---|
| C | 0.056822 | 0.080360 | 0.707088 | 0.4891 | −2.86 | −3.22 |
| $\Delta WLFPR_{t-1}$ | 0.778932 | 0.112392 | 6.930518 | 0.0000 | | |
| $\Delta HDI_t$ | −2.375939 | 7.727372 | −0.307471 | 0.7622 | | |
| $DUM_s$ | 0.263751 | 0.287024 | 0.918918 | 0.3710 | | |
| $ECT_{t-1}$ | −0.083848 | 0.045646 | −1.836912 | 0.0838 | | |
| $R^2$ | 0.798102 | Mean dependent var | | 0.316753 | | |
| Adjusted $R^2$ | 0.750596 | SD dependent var | | 0.520825 | | |
| SE of regression | 0.260102 | Akaike info criterion | | 0.341230 | | |
| Sum squared resid | 1.150101 | Schwarz criterion | | 0.589194 | | |
| Log likelihood | 1.246474 | Hannan–Quinn criter. | | 0.399643 | | |
| F-statistic | 16.80019 | Durbin–Watson stat | | 1.817443 | | |
| Prob (F-statistic) | 0.000010 | | | | | |

*Source*: Created by Author (2014) by using EVIEWS 8

serial correlation is not rejected. The next step is to test whether the human development index influence women's labour force participation rate in the short run and long run.

Table 5 shows the F Wald test statistics for short run coefficients. The results of the F Wald test statistics indicate that the human development index significantly positively influences women's labour force participation rate in the short run at $p < 0.001$. The findings of F Wald test statistic support hypothesis two. Human development index causes women's labour force participation rate in the short run.

The estimated short run coefficients, error correction term and Pesaran et al. (2001) critical values are given in Table 6. The t-statistic of the error correction term (ECT) is negative and more than Pesaran et al. (2001) upper bound critical value. This reveals that the human development index significantly influences women's labour force participation rate in the long run. The speed of adjustment of the ECT to long run equilibrium is 8.38 %.

**Table 7** VAR Granger causality/block exogeneity Wald test

| Excluded | $\chi^2$ | *df* | Prob. |
|---|---|---|---|
| Dependent variable: human development index | | | |
| WLFPR | 4.041680 | 2 | 0.1325 |
| DUM | 2.110443 | 2 | 0.3481 |
| All | 4.780177 | 4 | 0.3106 |
| Dependent variable: women's labour force participation rate | | | |
| HDI | 0.734471 | 2 | 0.6926 |
| DUM | 91.75279 | 2 | 0.0000 |
| All | 92.66415 | 4 | 0.0000 |

*Source*: Created by Author (2014) by using EVIEWS 8

The result of the t-statistic of the error correction term support hypothesis three. Human development index causes women's labour force participation rate in the long run.

### 6.5 Toda–Yamamoto Granger Non-causality Test

Table 7 shows the results of the Toda–Yamamoto Granger Non-Causality Test. The results of the Toda–Yamamoto Granger Non-Causality Test show that there is no causality between human development index and women's labour force participation rate. The augmented VAR used in estimating Toda–Yamamoto Granger Non-Causality Test statistics is two. The next section will discuss the research findings.

## 7 Discussion

The Bai–Perron's multiple breakpoint test at one time showed that there is a structural break point in human development index and women's labor force participation rate model in year 1997. There are many reasons for the presence of a structural breakpoint in the year 1997. Firstly, natural calamities in Fiji changed the societies mindset, particularly in the rural areas on the importance of educating and economically empowering women. According to Pelling and Uitto (2001), during the period 1987–1997, nine natural disasters have occurred in Fiji. Majority of the women population in the rural areas spend bulk of their time providing family labour on farms. As natural calamities have devastated the agriculture sector of Fiji, rural households have realised the importance of educating women. Secondly, agricultural land leases in Fiji have started to expire from year 1997. Many rural farmers have been displaced due to non-renewal of their land lease. Subsequently, rural farmers had to look for alternative sources of employment. This caused families to realise the importance of education in securing a good job. Thirdly, Fiji's reinstatement in Commonwealth in the year 1997 increased women's employment and education opportunities both locally and internationally. According to Sen's capability framework, an individual's freedom to make choices is influenced by socioeconomic, political and cultural factors. Parallel to the arguments of Sen's capability framework, this study also argues that natural calamities in Fiji have changed rural communities attitude on the need of educating women. The findings of this paper are similar to the findings of the studies conducted by Skjortnes and Zachariassen (2010), Okkolin et al. (2010), Cuban (2010) and Arar (2014). These studies found that culture interacts in the relationship between human development and women's labour force participation rate. This paper also

argues that the cultural and social norms of rural households in Fiji have been affected by socioeconomic, political and natural factors during the period 1990–1997. Traditionally, many rural households in Fiji have not believed in educating women, but this attitude has changed after rural farmers encountered natural disasters and land lease issues.

The findings of the ARDL bounds test used to test the relationship between human development index and women's labour force participation rate confirmed that human development causes women's labour force participation rate both in the short run and long run. In the context of Fiji, human development index is an important driver of women's labour force participation rate. The results of this study validate the importance of the approach taken by the government of Fiji to improve women's education as this will economically empower them. The findings of this study confirm that educated women are able to use their human capital to find a worthy employment. They are able to use their human capital to fight the cultural and social restriction that might stop them from seeking paid employment. Women in Fiji maintain strong social norms and cultural values that may exhibit lower likelihood of women participating in the workforce; however, if women have good education, they go a step further to improve the living conditions of their families by fighting against these social and cultural restrictions. The findings of this study are similar to the findings of the studies conducted by Cherif (2010), Shafiq (2010) and Malik and Courtney (2011). These studies found that discrimination against women in achieving quality education is a major problem in Muslim countries. This study also argues that cultural barriers restrict women from acquiring quality education. Unlike the case of Muslim countries, educated women in Fiji are able to use their human capital to fight against the cultural and social restrictions that might stop them from seeking employment. Parallel to the arguments of the Sen's capability framework, this study argues that cultural and social restrictions in Fiji do restrict women from seeking employment; however, educated women are able to use their human capital to fight against these restrictions in order to provide a better lifestyle for their families.

The results of the Toda–Yamamoto Granger Non-Causality Test show that there is no causality between human development index and women's labour force participation rate. There is no reconciliation between the results of the ARDL bounds test and Toda–Yamamoto Granger Non-Causality Test because ARDL bounds test is able to predict both short run and long run relationship between human development index and women's labour force participation rate whereas Toda–Yamamoto Granger Non-Causality procedure only predicts causality between human development index and women's labour force participation rate. The latter cannot predict the short run and longrun relationship between human development index and women's labour force participation rate.

There are two theoretical contributions of this paper. Firstly, this study contributes to the theoretical lacuna identified in the existing literature that reflects on the fact that even though human development plays a crucial role in women's labour force participation rate, existing literature on this subject matter is still under developed. None of the existing studies have integrated Sen's capability framework with empirical modelling on human development and women's labour force participation rate. This paper has used Sen's capability framework to examine how socioeconomic, political and natural factors affect women's freedom to make choices that enable them to achieve desired outcomes. Secondly, existing studies have used Sen's capability framework to examine gender related development in the context of the European countries. This is a pioneering study that integrates Sen's capability framework with empirical modelling on human development and women's labour force participation rate in the context of Fiji.

The next section will provide conclusion and policy implications.

## 8 Conclusion and Policy Implications

This paper has contributed towards the empirical modelling on human development and women's labour force participation rate in the context of Fiji. The research findings presented in this paper validates the research findings presented by earlier studies on human development and women's labour force participation rate (Skjortnes and Zachariassen 2010; Okkolin et al. 2010; Cuban 2010; Arar 2014). This paper found that human development causes women's labour force participation rate both in the short run and long run. This paper argues that educated women in Fiji are able to use their human capital to fight against cultural and social norms that might restrict them from seeking employment.

The research findings presented in this paper emphasises on the importance of gender based education policies that focus on improving women's education attainment. Fiji is a community based society and improving women's education attainment will generate a multiplier effect for the whole community. This multiplier effect is generated because educated women pass their knowledge to uneducated women via family networks. This multiplier effect is evident as many rural uneducated women in Fiji have started sustainable community based projects. Currently, the most immediate need in Fiji is to review existing education policies that are targeted towards different gender and minority groups so that these policies can effectively contribute towards developing an egalitarian society. Improving women's education attainment plays a dual role in society. Firstly, it reduces inequality of educational opportunities and strives for the development of an egalitarian society. Second, it generates a multiplier effect as knowledge is transferred from educated women to uneducated women via family networks.

The human development index used in this paper does not capture all the indicators of human development (Clark 2006). This is one of the limitations of this study. Future researchers may use alternative measures that captures all the information related to human development.

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