

# Influence Of Australian Coal Export On A\$/US\$ Exchange Rate: A Longitudinal Study

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## ABSTRACT

*This paper investigates the contribution of Australian coal export to determine the exchange rate of Australian dollar with the US dollar. The quarterly data of Australian coal export and the Australian dollar exchange rate from 1992-2009 are employed to measure the influence of Australian coal export on A\$/US\$ exchange rate. This study finds that the Australian coal export has a positive relationship with the exchange rate of A\$/US\$ and their relationship is becoming stronger. The findings of this research suggest that the volume of Australian coal export contributes about 8% to determine the exchange rate of A\$/US\$ between the period of 1992-2009. The results of this analysis confirm that for each one million tonnes export increase of Australian coal, the Australian dollar value against the US\$ increases by 0.002450 USD.*

**Keywords:** Australian Coal Export; Exchange Rate

## INTRODUCTION

Coal is the single largest foreign currency earner for Australia. According to the *Australian Economy 2010*, Australia has earned A\$160 billion by exporting its mineral resources. The relative sectoral contribution towards this export earnings is: coal A\$55 billion (around 34.37%), followed by ores A\$52 billion (around 33%), other mineral fuels A\$21 billion (around 13%), gold A\$17 billion (around 11%), and other metals A\$14 billion (around 9%) (ABARES, 2010). The volume and value of Australian coal export has increased significantly between the year 2007-08 to 2008-09 because of the prices have more than doubled during this period.

The impact of this large volume of export had raised the Australian dollar's value to a new high. The Australian dollar had recorded its highest value relative to the US dollar of 110.56 US cents on 28 July 2011. It had happened because of the export boom of Australian mineral resources. Arguably, Australian coal export is playing a vital role in making the Australian dollar stronger against the other currencies, especially US dollar.

Australia also has a huge deposit of coal under its surface. At the end of 2010, Australia had a recoverable Economic Demonstrated Resources (EDR) of hard coal (steam coal and coking coal) deposit of 76.2 billion tonnes. In addition to the EDR deposit, there is another 8.3 billion tonnes of Sub-economic Demonstrated Resources (SDR) in Australia (IEA, 2010). In fact, with total identified resources of hard coal of around 114 billion tonnes, Australia's total coal resources are substantially larger than it is estimated; that means, if Australia keeps her production at the 2008 rate of around 398 Mt (Million tonnes) per year, the EDR will be adequate to support about 191 years of supply. Thus the deposit of the coal will support Australian economy more than 191 years.

Australia is the fourth largest producer and the largest exporter of hard coal in the world. According to the ABARE Energy Projections 2010, Australian coal production is projected to increase at an average annual rate of 1.8 per cent over the period of 2010–2030 and domestic consumption is projected to decline at an average annual rate of 0.8 per cent during the period of 2010–2030. Australia had exported hard coal 261.6 Mt (steam coal 136.5 Mt and coking coal 125.25 Mt) during the year 2008–09. Australian coal exports are projected to increase at an average

annual rate of 2.4 per cent (450 Million Tonnes) during the period of 2010-2030. This increase in export reflects strong growth in demand for coal in China, India and other developing economies that have to be met by imports. The Australian hard coal industry is well positioned to take advantage of the expected growth in the world coal consumption over the next decades.

**Table 1 Contribution to Australian total export by sector**

Year	Total Earned by Exporting Goods and Services (A\$ million)		Exchange Rate A\$/US\$	Total Coal Export			Total Iron and other Mineral Export			Total Gold Export		
	Services	Goods		Volume (Mt)	Value (A\$ m)	%	Volume (Mt)	Value (A\$ m)	%	Volume (t)	Value (A\$ m)	%
1991-92	41867	28304	.7664	123.31	6949	25	111.56	8477	30	259	4605	16
1992-93	47546	29755	.6968	129.18	7620	26	103.49	8312	28	298	4580	15
1993-94	53769	29877	.6889	129.05	7255	24	111.53	8233	28	275	5520	18
1994-95	57894	30367	.7390	126.24	6937	23	119.09	8448	28	277	4907	16
1995-96	65363	34437	.7553	138.55	7840	23	130.37	9614	28	316	5849	17
1996-97	70256	36048	.7801	145.75	8006	22	128.27	9803	28	325	6877	19
1997-98	74210	40912	.6797	162.61	9587	23	146.76	11373	28	340	7227	18
1998-99	74464	39210	.6257	169.4	9289	24	136.42	11635	30	504	6719	17
1999-00	82657	45482	.6295	175.78	8335	18	139.28	12361	27	334	6597	15
2000-01	98189	57720	.5391	193.50	10843	19	157.37	15839	27	296	6222	11
2001-02	98655	57200	.5238	197.87	13423	23	156.72	15286	27	304	6645	12
2002-03	94614	57002	.5838	207.74	11990	21	165.87	15361	27	269	7648	13
2003-04	92978	53751	.7113	218.43	11000	20	187.71	15439	29	313	7031	13
2004-05	98540	68561	.7513	231.31	17240	25	209.83	20535	30	311	6472	09
2005-06	104382	91294	.7457	231.30	24352	27	239.31	29772	33	306	9087	10
2006-07	108800	106680	.7840	243.59	21928	21	247.43	36041	34	349	10740	10
2007-08	117420	116177	.8958	251.99	24599	21	294.30	41964	36	411	12272	11
2008-09	124216	160221	.7494	261.60	54957	34	323.52	52691	33	437	17508	11

Source: Adapted from ABARES (2010)

Table 1 shows that in 2008–09, Australia had earned A\$125 billion (around 78% of total export earnings of mineral resources) by exporting three mineral resources (i.e., coal 34%, ores 33% and gold 11%). It has happened because the significant increase in the prices of mineral resources in the world market. This boom in resources export has helped Australian dollar to reach its highest level in 33 years. Anecdotal data suggests that there is a significant link between the volume of Australian coal export and rise of A\$. This view is also supported by the fact that after the end of Asian financial crises from that continued from 1998 to 2003, the A\$ became stronger against the US\$ along with the increase in the volume of Australian coal export from 218.43 million tonnes (Mt) in 2003–04 to 231.31 Mt in 2004–05. It was observed during this period that the A\$ became stronger from 0.7113 US\$ to 0.7513 US\$. It may also be noted that the Australian coal export remained mostly the same between 2004–05 and 2005–06, and the value of A\$ also remained mostly the same. The volume of Australian coal export had increased from 231.30 Mt to 243.59 Mt from the year 2005–06 to 2006–07 and next year from 243.59 Mt to 251.99 Mt and the value of A\$ increased from 0.7457 US\$ to 0.7840 US\$ and 0.7840 to 0.8958 US\$ respectively. Thus, these events make an anecdotal case for an obvious link between the volume of Australian coal export and the rise of A\$.

It should be noted, however, that the Australian dollar exchange rate against the US\$ is influenced by many factors; some factors are internal and some are external. The main internal factors are: balance of trade (export vs. import), employment opportunity in Australia, interest rate, retail sales, commodity price, inflation rate, government deficits, ownership of large companies, ownership of real estate etc. The relevant external factors are: relative job opportunities, interest rates, inflation rate, government policies, volume of export and import etc. in the trading partner countries. The world financial and political situation also influences the Australian dollar exchange rate. The 1998 Asian financial crisis and the global financial crisis of 2008–09 had hit the Australian dollar more severely than other established currencies although, the internal factors in Australia remained robust during these periods.

The official interest rates (reviewed monthly) by the Reserve bank of Australia (RBA) and the official inflation rate in the economy are the two most powerful internal factors to influence the A\$ exchange rate. A rise in the RBA official rate usually is accompanied by a rise in A\$ value because higher market interest rate in Australia makes it an attractive place and currency to invest. This leads to an increase in demand for A\$, and hence its value. Higher inflation in the economy, on the other hand, signals a reduction in the purchasing power of the currency and is usually leads to a fall in A\$ exchange rate. It has also been observed that A\$ value is highly positively correlated with the world commodities (gold, coal, iron ore, copper etc.) price. Higher the commodities price, higher the A\$.

External factors also influence the Australian dollar exchange rate. For example, if the USA data show strong growth then the Australian dollar will be weaker against the US dollar because strong growth means strong economy and strong economy means the buying power of its currency will increase and subsequently its currency becomes stronger than other currencies. When the European Union (EU) inflation rates go higher then, the value of Australian dollar goes-up against the US dollar. The logical explanation is that when the inflation rates of EU go high, it means that EU economy is weaker and USA economy is dependent on EU economy and subsequently, the USA economy becomes weaker and its effect goes to the exchange rate of A\$/US\$ and Australian dollar becomes stronger against the US dollar. It is proved that too many factors are working to fix the Australian dollar exchange rate against the US dollar. This study historically examines the influence of Australian coal export to change the value of A\$/US\$.

#### **LITERATURE RELATED TO FACTORS AFFECTING AUSTRALIAN DOLLAR VOLATILITY**

Australian dollar volatility is an important issue for Australian exporters, importers, as well as Australian government. A vast amount of literature has been produced on the effect of exchange rate on export; or on international trade; or on macroeconomic indicators ; but surprisingly little attention has been paid to measure the reverse effect of export on the exchange rate of a country. Researchers, such as Sheen and Kim (2002), Aruman and Dungey (2003), Edison (2002) and the Reserve Bank of Australia (RBA), have been attempting to explain the causes of the volatility of the Australian dollar (AUD). Simpson and Evans (2003) claim that Australia is a commodity rich country; therefore, movements in commodity prices are reflected in the volatility of the exchange rate. The authors concluded that commodity price changes can lead to movements in the Australian dollar versus US dollar exchange rate. On the other hand, Branson (1976) claims that the movements in current account balances affect the exchange rates. Authors, such as, Artus (1981) and Driskill (1981) argue against the above claims by suggesting that exchange rates adjust rapidly to eliminate any current account imbalances. Mussa (1984), however, has a different view. He claims that the currency value is influenced strongly by expectations concerning future policies and events. Empirical investigations find that the exchange rate fluctuations are found to be substantial and persistent and largely unexplained by movements in macroeconomic fundamentals (Frenkel and Mussa, 1980, Flood and Mark 1996, Taylor 1995). In the floating exchange rate regime, it is a fact that many factors are working simultaneously to determine the exchange rate; some factors can be explained and some factors can not be explained. For this reason, the result of the debate on ‘factors affecting the exchange rate’ is still inconclusive and unsolved.

During the Asian financial crisis of 1998–2003, the A\$ did hit its lowest level because the Australian economy is a commodity based economy and the Australian economy is dependent mostly on the commodity export to Asia. During the Asian financial crisis period, the internal factors of Australian economy remained mostly the same but the external factors worked so strongly that its currency value moved quickly. The Governor of the Reserve Bank of Australia, Ian Macfarlane (2000) said in a press conference ‘The exchange rate has behaved during 2000 in a way that no-one predicted’. In the light of this statement by Ian Macfarlane, it can be said that a number of factors affect the Australian dollar exchange rate and the main factors such as export/import ratio, interest rate, inflation which are important contributors for movement of Australian dollar against the US\$. This paper will examine the effect of Australian coal export on Australian dollar exchange rate against the USD.

## METHODOLOGY

### Sources of Data

The main objective of this paper is to investigate the influence of Australian coal export on Australian dollar exchange rate with the US dollar. The finding results from this investigation provide evidence that the volume of Australian coal export how much affects to determine the exchange rate of Australian dollar. Correlation and Regression analysis are employed to achieve the goal. These statistical tools will separate the influence of Australian coal export on exchange rate than other contributors. For econometric analysis and estimation of the volume of Australian coal export impact on Australian dollar exchange rate against the US\$, the following set of data are analysed to find the results.

1. Australian dollar exchange rate against the USD (A\$/US\$)
2. Australian coal export (metric tonnes)

The data used for this analysis are secondary data. The quarterly data of Australian dollar exchange rate against the US\$ and the volume of Australian coal export are used over the last 18 years which are collected from the Australian Bureau of Agricultural and Resources Economics (ABARE) and the Reserve Bank of Australia (RBA). ABARE and RBA are reliable sources of data in Australia. The quarterly data for Australian coal export are available in the data bank of ABARE. ABARE does not maintain weekly or monthly data for Australian coal export in its data bank; as a result, the exchange rate of Australian dollar also needs to be considered quarterly for this reason. Please note that the exchange rate of Australian dollar uses spot rate as it in the international market.

### Correlation Analysis

In any investigation of relationship between two logically connected variables, the correlation analysis is proven to be a useful tool for measuring the relationship. Robert (2006) states that correlation is primarily concerned with finding out whether a relationship exists and with determining its direction and strength. According to Cooper and Schindler (2003), the value for a Pearson Product correlation coefficient can fall between -1.0 to 1.0. A coefficient of 0.00 means there is no correlation between the variables. If the result,  $r$ , is positive then Y and X are directly related – i.e., when X increases, Y tend to increase. If  $r$  is negative, Y and X are inversely related – i.e., when X increase, Y tend to decrease, and *vice versa*.

There are many ways to interpret the results of correlation coefficients. Table 2 summarises a ‘standard form’ of interpretations used by many scholars to interpret correlation coefficients, which are also employed in this study

**Table 2 Interpretation of Correlation Coefficient**

Positive	Interpretation	Negative
Zero to 0.19	Slight, Almost Negligible Correlation	-0.19 to Zero
0.20 to 0.39	Low Correlation	-0.39 to -0.20
0.40 to 0.69	Moderate Correlation	-0.69 to -0.40
0.70 to 0.89	High Correlation	-0.89 to -0.70
0.90 to 1.00	Very High Correlation	-1 to 0.90

Source: Adapted from CSAP Prevention Pathways (2003, p.1)

### Simple Linear Regression

Simple Linear Regression Analysis can be employed to investigate the functional relationship of the volume of Australian coal export and the Australian dollar exchange rate with the US\$. Simple linear regression analysis is a powerful statistical tool to measure the functional response between two variables, i.e., one independent variable and one dependent variable. Simple linear models often provide a very good approximation of one (dependent) variable in response to another (independent) variable (Paul, William & Betty, 2006). This analysis can estimate the extent of change in A\$ exchange rate for each additional tonne export of Australian coal.

### PEARSON PRODUCT MOMENT CORRELATION (R) OF THE VOLUME OF AUSTRALIAN COAL EXPORT AND AUSTRALIAN DOLLAR EXCHANGE RATE AGAINST THE US\$

The quarterly data of Australian coal export and the exchange rate of Australian dollar against the US dollar are used to measure the strength and directional relationships between the volume of Australian coal export and the Australian dollar exchange rate. The data covers a period of 18 years ranging from 1992 to 2009. Starting from 1992 the analysis drops the earliest year from the range at each successive stage. Thus the first stage covers a period of 18 years, the next stage covers 17 years, followed by 16 years, and so on. The purpose of this process is to test how the relationship between the volume of Australian coal export and the Australian dollar exchange rate change as the time range becomes shorter and regresses to the more current periods. It is expected that findings from the analysis will reveal whether their relationship was becoming stronger or weaker as years go by.

**Table 3: Correlation coefficients between the volume of Australian coal export and Australian dollar exchange rate from 1992–2009**

Year	Variables	NOV*	Pearson Correlation r	Significant (2-tailed)	Level of Significant	Result
1992-2009	1. The Volume of Australian Coal Export (Metric Tonne) 2. Australian Dollar Exchange Rate against the US Dollar	18 years X 4 quarter = 72	0.287	0.015	.05	r= 0.287, p<.05 (Low Correlation)
1993-2009		17 years X 4 quarter =68	0.325	0.007	.01	r= 0.325, p<.01 (Low Correlation)
1994-2009		16 years X 4 quarter =64	0.322	0.009	.01	r= 0.322, p<.01 (Low Correlation)
1995-2009		15 years X 4 quarter =60	0.377	0.003	.01	r= 0.377, p<.01 (Low Correlation)
1996-2009		14 years X 4 quarter =56	0.454	0.000	.01	r= 0.454, p<.01 (Moderate Correlation)
1997-2009		13 years X 4 quarter =52	0.626	0.000	.01	r= 0.626, p<.01 (Moderate Correlation)
1998-2009		12 years X 4 quarter =48	0.755	0.000	.01	r= 0.755, p<.01 (High Correlation)

Source: Table 3 was generated for this study. *NOV\** Refers to the number of variables that were processed

The results of the Table show that the relationships between the volume of Australian coal export and the Australian dollar exchange rate against the US\$ are all positive and statistically significant. It means that when the volume of Australian coal export increases, the Australian dollar value against the US\$ also increases, similarly when the volume of Australian coal export decreases, the Australian dollar value against the US\$ also decreases.

The logical explanation is that when the volume of Australian coal export increases, Australia earns more US dollar and the demand for A\$ increases. Its effect goes directly to the exchange rate and it makes A\$ stronger against the US\$. Conversely, when the volume of Australian coal export decreases Australia earns less US\$ and demand for A\$ falls. Its effect goes directly to the exchange rate of A\$/US\$ and it makes A\$ weaker against the US\$. However, as seen in Table 3, the relationships between the volume of Australian coal export and the Australian dollar exchange rate against the US\$ are stronger in the 11 year period between 1998–2009 (r=0.755) than the 18 year period of 1992–2009 (r=0.287). It also shows that the strength of their relationship is increasing. This is due to the fact that every year Australia is exporting more coal than previous year while the price of coal in international market is also increasing.

Table 3 and the result of period 1998-2009 illustrates that the volume of Australian coal export has 76 per cent responsiveness with the Australian dollar exchange rate against the US dollar. The correlation coefficient (r) of 0.755 indicates that volume of coal export can explain 57 per cent ( $r^2$ ) of variation in A\$ exchange rate. The results of the confidence level also suggest that the probability of this being not true is only one per cent or less. In other words, this relationship is to exist more than 99 per cent of time.

**EFFECTS OF AUSTRALIAN COAL EXPORT VOLUME ON AUSTRALIAN DOLLAR EXCHANGE RATE**

Quarterly data of Australian coal export and the Australian dollar exchange rate against the US dollar from 1992-2009 are used for simple linear regression analysis. It is considered that the Australian dollar exchange rate against the US dollar is the dependent variable (Y value) and the volume of Australian coal export (metric tonne) is an independent variable (X value).

**Table 4 Output of simple linear regression analysis of Australian coal export and the Australian dollar exchange rate against the US dollar**

**Variables Entered/Removed<sup>b</sup>**

Model	Variables Entered	Variables Removed	Method
1	Total_Coal_Export_Metric_Tonnes <sup>a</sup>	.	Enter

- a. All requested variables entered.
- b. Dependent Variable: Exchange\_Rate\_A\$\_against\_US\$

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.287 <sup>a</sup>	.082	.069	.09941

- a. Predictors: (Constant), Total\_Coal\_Export\_Metric\_Tonnes

**ANOVA<sup>b</sup>**

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.062	1	.062	6.262	.015 <sup>a</sup>
	Residual	.692	70	.010		
	Total	.754	71			

- a. Predictors: (Constant), Total\_Coal\_Export\_Metric\_Tonnes
- b. Dependent Variable: Exchange\_Rate\_A\$\_against\_US\$

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.590	.048		12.243	.000	.494	.686
	Total_Coal_Export_Metric_Tonnes	2.450E-9	.000	.287	2.502	.015	.000	.000

- a. Dependent Variable: Exchange\_Rate\_A\$\_against\_US\$

Source: Developed for this study

### Least Squares Regression Line and Functional Relationship of the Volume of Australian Coal Export and Australian Dollar Exchange Rate against the US Dollar

From the Table 4, the least-squares regression line is

$$\hat{y}_i = b_0 + b_1 x_i = .590 + (0.000000002450 x_i)$$

Where the slope ( $b_1=0.000000002450$ ) has been determined and  $b_0$  is found to be 0.590

The slope of the regression line is positive; suggesting that a direct relationship exists between the volume of Australian coal export and the Australian dollar exchange rate. The value of the slope ( $b_1=0.000000002450$ ) indicates that for each tonne increase in Australian coal export, increases the Australian dollar value against the US dollar by 0.000000002450 USD.

### Prediction of Australian Dollar Value against the US Dollar

The prediction equation is  $Y_i = B_0 + B_1 X_i$

Where,

$Y_i$  = the predicted dependent variable (Australian dollar value against the US dollar)

$B_0$  = constant

$B_1$  = unstandardized regression coefficient

$X_i$  = value of the predictor variable (The volume of Australian coal export)

Predicted Australian dollar value against US dollar  $y_i = 0.590 + (0.000000002450 \times \text{Australian coal export})$

In the 1<sup>st</sup> quarter of 1998, when the volume of Australian coal export in the world market was 39,080,000 tonnes, the predicted Australian dollar value against the US dollar is:  $0.590 + (0.000000002450 \times 39080000) = 0.6857$  USD

The observed value of Australian dollar against the US dollar at that date is 0.63 USD

The residual  $r_i$  is

$$r_i = y_i - \hat{y}_i = 0.6300 - 0.6857 = -0.0557 \text{ USD}$$

However the standard Error of the Estimate in the Model Summary Table is 0.0994. This means that at the 95% confidence interval, the predicted Australian dollar value against the US dollar of 0.6857 USD lies between 0.4909 USD ( $0.6857 - (1.96 \times 0.0994)$ ) and 0.8805 USD ( $0.6857 + (1.96 \times 0.0994)$ ).

### Evaluating the Strength of the Prediction

The Model Summary Table presents the proportion of variance accounted for the Australian dollar value against the US dollar by the volume of Australian coal export. The correlation coefficient is 0.287 and the R-Square is 0.08, it means the predictor variable of the volume of Australian coal export has explained 8% of the variance in the dependent variable of Australian dollar exchange rate against the US dollar. Obviously there are other factors responsible for exchange rate variations.

The ANOVA Table describes results from the test of the null hypothesis that R-Square is zero. It means no linear relationship between the volume of Australian coal export and the Australian dollar exchange rate against the US dollar. The ANOVA Table presents that F statistic is 6.262, with an observed significance level of less than 0.05. So, the hypothesis that there is no linear relationship between the volume of Australian coal export and the Australian dollar exchange rate against the US dollar is rejected.

### Identifying Independent Relationship

The Coefficients Table presents the Standardized Beta coefficient between the volume of Australian coal export and the Australian dollar exchange rate against the US dollar. The Beta coefficient is positive and statistically significant at the level 0.05. It indicates that higher the volume of Australian coal export in the world market, higher the value of Australian dollar against the US dollar. (Beta= 0.29,  $t=2.5$ ,  $p<.05$ ).

Quarterly data of Australian coal export and Australian dollar exchange rate from 1992–2009 are used to predict the Australian dollar value against the US dollar in 2<sup>nd</sup> quarter of every year from 1992–1998. The findings from this analysis will indicate how the volume of Australian coal export affects the Australian dollar exchange rate. This analysis will also indicate that when the relationship between the volume of Australian coal export and the Australian dollar exchange rate become closer one another in 2<sup>nd</sup> quarter from 1992–1998.

**Table 5 Results of predicted value and the observed value of Australian dollar exchange rate against the US dollar from 1992–1998**

Year	Quarter	Variables	Observed Value of 2 <sup>nd</sup> Quarter (USD)	Predicted Value of 2 <sup>n</sup> Quarter (USD)	95% Confidence Interval		Residuals (USD)
					Lower Bound (USD)	Upper Bound (USD)	
1992	1	1. The Volume of Australian Coal Export 2. Australian Dollar Exchange Rate against the US Dollar	0.7600	0.6630	0.4715	0.8611	0.0970
1993	1		0.6900	0.6692	0.4744	0.8640	0.0208
1994	1		0.7300	0.6656	0.4708	0.8604	0.0644
1995	1		0.7200	0.6728	0.4777	0.8676	0.0472
1996	1		0.7900	0.6736	0.4788	0.8684	0.1164
1997	1		0.7600	0.6811	0.4863	0.8759	0.0789
1998	1		0.6300	0.6857	0.4909	0.8805	-0.0557

Source: Table 5 was generated for this study

Results from the Table 5 reveal that the residual values from 1992–1997 are all positive because the predicted value lies below the observed value. But in 1998, the residual value is negative because the observed value lies below the predicted value. It is understood from the Table that the values of residuals do not follow any rule. It means that the value of residuals increase or decrease in each period compared to the previous period. According to the Table 5, the lowest value of residual is 0.0208 USD in 1993. It indicates that the difference (residuals) between the observed value (0.6900 USD) and the predicted value (0.6692 USD) is minimum (0.0208 USD) in this period and this is the 'Best fit' line in this regression. It means that the relationship between the volume of Australian coal export and the Australian dollar exchange rate become closer one another in 2<sup>nd</sup> quarter 1993 during the prediction period of 1992–1998.

### CONCLUDING REMARKS

This paper examined the effects of the volume of Australian coal export on Australian dollar exchange rate against the US\$. This study is able to confirm that the volume of Australian coal export has a positive relationships with the exchange rate of A\$/US\$. The results of the analysis suggest that when the volume of Australian coal export increases, the Australian dollar value against the US\$ also increases.

This study reveals that the relationships between the volume of Australian coal export and the exchange rates of A\$/US\$ are improving rapidly. It means that as days pass, the volume of Australian coal export is carrying more weight in determining the exchange rate of A\$/US\$. This research finds that the volume of Australian coal export has 8% effect on the determination of the exchange rate of A\$/US\$ in the period of 1992–2009 and 57% in the period of 1998–2009.



The empirical results reported within this paper confirm that for each one million tonnes increase in Australian coal export, the Australian dollar value against the US\$ increases by 0.00245USD. According to this analysis, the lowest value of residual is 0.0208 USD in 1993 and this is the 'Best fit' line in this regression.

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**NOTES**